Spring 6-13-2014

Factors Relating to Substance Abuse Relapse: A Survival Analysis of Adults Living in Oxford House Recovery Homes

Ronald D. Harvey
DePaul University, ron_harvey@sbcglobal.net

Factors Relating to Substance Abuse Relapse:
A Survival Analysis of Adults Living in Oxford House Recovery Homes

A Dissertation

Presented in

Partial Fulfillment of the

Requirements for the Degree of

Doctor of Philosophy

By

Ronald Harvey

June, 2014

Department of Psychology

College of Science and Health

DePaul University

Chicago, Illinois

Dissertation Committee

Leonard Jason, PhD, Chairperson

Joseph R. Ferrari, PhD

LaVome Robinson, PhD

Douglas Bruce, PhD

Mona M. Shattell, PhD, RN, FAAN

Acknowledgements

The author would like to thank my dissertation committee in advance for their invaluable comments and input at my proposal defense meeting. Most importantly, the author is deeply grateful to my Chair, Dr. Leonard Jason, for his patience, guidance, and encouragement on this project and throughout the author's career as a graduate student. The author is also in debt to the Oxford House participants who provided the data used in this dissertation; I look forward to being of service to them by sharing these results and giving back to this inspiring community. The author also wishes to thank the staff at DePaul's Center for Community Research and the Oxford House Ex-Offender Aftercare research team, in particular Corinne Weaver for her help in co-managing another research project with the author. I also wish to thank Steve Miller for his help answering my questions on survival analysis. Finally, I wish to dedicate this dissertation to Jerome and Shirley Harvey, my mother and father. I am forever grateful for their support and the support of the entire Harvey family.

Biography

The author was born in Joliet, Illinois, October 8, 1961. He graduated from Lincoln-Way High School in 1979, received his Associates in Arts (Computer Science) degree from Joliet Junior College in 1985. After an 18-year career in information technology, investment banking, and technology management, he left the business world, traveled throughout Russia and Ukraine in 2001-2003. Inspired by these experiences abroad, he returned to university in 2003 to earn a Bachelor of Arts degree from Illinois School of Professional Psychology in Chicago on a Provost Scholarship in 2005. After three semesters in the social psychology PhD program at UIC, he entered DePaul's Community Psychology program in 2007.

In 2009, he was awarded a U.S. Student Fulbright grant to fund independent research on the feasibility for starting Oxford House-style recovery homes in Bulgaria. Harvey performed this research as an enrolled third year student over the 2009-2010 academic year. In November 2012, he was awarded (with an undergraduate student partner) a DUOS (Doctoral & Undergraduate Opportunities for Scholarships) grant from DePaul University to study "The Effects of Child Presence on Social Support for Mothers in Oxford House." He is currently the Project Director of the NIH-funded research project, "Evaluating Alternative Aftercare Models for Ex-Offenders." This study is a randomized, 2-year longitudinal study of 270 male and female ex-offenders existing substance abuse treatment who are assigned to Oxford House self-run recovery homes, a professionally staffed therapeutic community, and usual aftercare.

Ronald Harvey is a lifetime member of the Fulbright Association. In 2011, he joined the Fulbright Association Chicago Chapter Board as the Board's Secretary. In January 2013 and 2014, the Association elected and re-elected him President of the Fulbright Chicago Chapter.

Table of Contents

List of Tables

List of Figures

Abstract

Alcohol and other drug (AOD) abuse, treatment, and subsequent relapse and re-treatment are a common pattern faced by clients and AOD treatment providers. Relapse and re-treatment significantly contributes to the overall societal costs of substance use disorder (SUD) treatment, injury, and incarceration. Therefore, it might be useful to treatment providers to become aware of of the factors leading to AOD relapse after treatment. This dissertation examined the relationship of individual factors and AOD relapse among residents of self-run aftercare recovery homes called Oxford House over the course of a one-year study. To accomplish this, this study employed discrete-time survival analysis techniques that compared baseline hazard (risk of relapse) to hypothesized hazard models that included time-invariant and time-varying factors. This dissertation used archival data gathered across four time periods during a one-year study of 897 men and women participants living in 170 Oxford Houses from a U.S. national sample. This study selected a data subset of 268 men and women who entered the OH setting within 60 days of the start of the one-year study to limit eliminate pre-study effects. First, the baseline hazard rates and survival functions were calculated. Based on prior research, four models were constructed to test four hypotheses that were compared for statistically significant effects against baseline hazard rates. First, baseline demographics - age, marital status, and level of education – will be significant predictors of hazard. Second, baseline addiction severity - length of sobriety upon entry into the OH, number of previous treatments, and ASI alcohol, drug, and psychiatric severity composite scores – will be significant predictors of hazard. Third, baseline variables related to employment will be significant predictors of hazard. Fourth, changes in drug and alcohol abstinence self-efficacy over the course of the one-year study will significantly affect hazard rates. Results indicated two of the four hypotheses were supported. The overall model for addiction severity was significant with more severe SUD and psychiatric problems significantly predicted higher hazard to relapse, specifically ASI alcohol severity, ASI psychiatric severity, and the number of previous drug and alcohol treatments. ASI drug severity and days since last

used substances did not contribute significantly to the model. The fourth hypothesis time-varying changes in abstinence self-efficacy across the one-year study did significantly affect hazard. Closer examination indicated that only increases in alcohol abstinence self-efficacy reduced hazard rates, and that changes in drug abstinence self-efficacy had no effects on hazard. Further, neither of the overall models for the two hypotheses involving baseline demographic and employment variables - age, marital status, level of education, employment income, days employed – significantly altered hazard rates compared to baseline. Implications based on these results are discussed. OHs could potentially reduce relapse by providing closer monitoring and referring additional services to residents who have more severe addiction severity prior to coming to live in an OH, and to enhance abstinence self-efficacy, particularly for alcohol. From a design and measurement standpoint, these results indicated that researchers should measure alcohol and drug abstinence self-efficacy separately rather than conflating them, or only measuring self-efficacy for drug of choice. In addition to these findings, this dissertation also represents the first use of survival analysis techniques to analyze relapse occurrence among Oxford House residents. This study also contributes to the literature by performing a rare survival analysis of relapse using a large national sample living in relatively homogenous settings over the course of one year. The author discusses additional future research and advocates research designs amenable to survival analysis techniques, and believes that further survival analyses of OHs are useful and warranted.

Introduction

Alcohol and other drug (AOD) addictions are a widespread health issue in the United States. Recent data from the Substance Abuse and Mental Health Services Administration (SAMHSA) reported that 8.7 percent of the U.S. population representing 22.1 million Americans aged 12 and older had AOD dependence or abuse problems in 2010, and were responsible for approximately 9,000 drug-induced deaths yearly (SAMHSA, 2010a). Eighteen percent of new AIDS cases in the US result from injection drug use (CDC, 2011). Alcohol and drug problems also create serious social problems; AOD-related arrests and incarceration have significantly contributed to prison overpopulation and the related costs thereof (Popovici, French, & McKay, 2008). In addition, alcohol and illicit drugs are increasingly involved in injuries and accidents; visits to emergency rooms involving illicit drug use alone increased from 991,640 annually in 2004 to 1,171,024 in 2010 (SAMHSA Center for Behavioral Health Statistics and Quality, July 2, 2012).

Fortunately, AOD problems are treatable. In the US in 2010, approximately 11.2% (2.6 million persons) of the population with AOD problems received treatment from a hospital, rehabilitation center, or other mental health facility (SAMHSA, 2010b). However, if the treatment goal is to remain abstinent from AOD, sustained successful treatment outcomes are often elusive. Of the 2.6 million persons seeking AOD treatment in 2010, approximately 57% of these clients (1.4 million) had been in treatment at least once prior (SAMHSA, 2010b). Other studies indicated that between 40% to 70% of patients who obtain treatment will relapse to problematic AOD using at least once (NIDA, 1999). For example, (Ilgen, McKellar, & Tiet, 2005) found that 69% of 2,231 individuals exiting a treatment program had relapsed after one year. People experiencing AOD problems have higher relapse rates than other chronic illnesses such as diabetes type I (at 30-50%) but lower than hypertension and asthma (50-70%); (McLellan, Lewis, O'Brien, & Kleber, 2000).

These figures suggest that there may be a pattern of AOD use, treatment, post-treatment relapse to problematic AOD use, and subsequent retreatments (Warner & Kramer, 2008). The

cycle of repeated treatments has been called the "revolving door" of AOD treatment (White & Kurtz, 2006). Given that total AOD treatment care costs in the US are estimated at $12 billion annually, it follows that relapse and re-treatment are significant components of the overall costs of AOD problems. Thus, knowledge of the post-treatment factors that might lead to AOD relapse could potentially be used to improve delivery of treatment, reduce the re-treatment costs for individuals and insurance provider, and to increase the availability of treatment facilities for those seeking treatment for the first time.

The present study examined the relationship between the demographic and psychological variables that affected the occurrence of relapse and the time-to-relapse among men and women who lived in long-term substance abuse aftercare settings called *Oxford Houses* (OHs). Oxford Houses are a network of non-professional, self-run, and self-financed recovery homes whose goals, structure, rules, and operations are relatively uniform (Ferrari, Jason, Sasser, Davis, & Olson, 2006b; Oxford House Inc., 2004). Data in the present study was from an archival dataset of OH residents who participated in a one-year longitudinal study, which ended in 2002.

This study employed a set of statistical techniques called *discrete-time survival analysis* (Willett & Singer, 1993). Discrete-time survival analysis is a type of statistical regression that describes whether an event occurs significantly more frequently among differing groups or with a covariate, and when events occur (Singer & Willett, 2003). The data analyzed were OH resident's time-invariant factors at the beginning of the original study (e.g. AOD severity, co-occurring psychiatric disorders, demographic and marital status) as well as factors that changed across the course of the study, such as drug and alcohol abstinence self-efficacy (Jason, Davis, & Ferrari, 2007a). This study used discrete-time (versus continuous-time) survival analysis techniques because the archival data were gathered at baseline and at four-month intervals over the course of one year.

There are compelling potential benefits for examining the phenomenon of relapse that occur over time in specific settings. Moos (1996) postulated a model in which the client's personal factors and the objective characteristics of the treatment program interact to influence

the intermediary processes (social climate, client satisfaction) that ultimately influence the client's adaptation to a sober lifestyle (Figure 3). Awareness of client factors related to relapse in OH could advance treatment matching and person-environment fit to improve outcomes (Babor & Del Boca, 2003; Moos, 2005). Knowledge of relapse factors of previous participants could inform intake and screening procedures and could determine whether a setting is appropriate for the individual (Melnick, De Leon, Thomas, & Kressel, 2001; Walters, 2002). In addition to matching clients to settings, analysis of the patterns and timing of relapse can alert staff or co-residents to emphasize certain aspects of treatment to individuals, or offer additional resources for particularly vulnerable populations at specific phases of treatment (Ilgen, Tiet, Finney, & Moos, 2006; Moos, 2003a).

In addition, this study represents the first application survival analysis techniques to examine AOD relapse events using a nationally representative sample of OH residents in the US. The National Survey on Drug Use and Health, the most comprehensive yearly survey of AOD treatment in the USA, does not survey "residential drug use treatment centers" (Office of Applied Studies, 2008, p. 117). Thus, these statistics do not include aftercare settings such as OHs; researchers and practitioners are currently uninformed how OHs compare to the relapse rates of other treatment modalities in the US. Therefore, this study is a unique opportunity to assess a relatively standardized and uniform setting and the various factors affecting time to relapse among a diverse U.S. population of people in AOD recovery.

This dissertation is organized as follows. First, AOD relapse is discussed and operationalized for the purpose of the study. Next is a description of the OH model and the likely theoretical processes that are active in OH recovery settings that are protective against relapse. Next is an examination of the literature describing the factors that are protective against AOD relapse that were present in the archival data. A set of four hypotheses based on previous studies are presented. In the Methods section, survival analysis techniques are described in detail, the data of a qualifying sample data of OH residents used for the analysis, the necessary steps to create the dataset, the processes for selecting and structuring the data suitable for survival

analysis, and how these techniques were used to analyze the data. The Results and Analyses section describes the statistical analyses for the hypotheses in text and table formats, including a short section of supplemental hypotheses. Finally, a brief Discussion summarizing the results are presented, an interpretation of the results and their meaning, and suggestions for future research.

The Problem of AOD Relapse

Concerning AOD problems, the terms "sobriety," "relapse," "recovery," "remission," "treatment," are fraught with ambiguity and often controversy (White & Ali, 2010). Currently, there is no single definition of "recovery" from AOD problems (SAMHSA, 2012; The Betty Ford Institute Consensus Panel, 2007). Because AOD problems involve complex social, relational, medical, and behavioral components that may develop over many years, defining what AOD problems are, how best to treat them, and what constitutes successful treatment, are difficult and sometimes controversial subjects (Miller & Miller, 2009).

This study will not elaborate on the differing approaches and philosophies of successful treatment of AOD problems. However, what follows is a brief summary of some definitions of successful treatment, AOD relapse, and the explicit criteria to measure relapse used in this study.

Two recent reviews (Donovan, Bigelow, Brigham, Carroll, Cohen, Gardin, Hamilton, Huestis, Hughes, Lindblad, Marlatt, Preston, Selzer, Somoza, Wakim, & Wells, 2012; Tiffany, Friedman, Greenfield, Hasin, & Jackson, 2012) described and commented on recommendations produced by a panel of 55 addiction and treatment experts convened by the National Institute on Drug Abuse (NIDA). The NIDA panel defined primary outcome measures for AOD treatment. Donovan et al. (2012) summarized the expert panel recommendation that drug-taking behavior, as measured by self-reports and biological indicators, could be adopted widely and be the most consistent and reliable method for evaluating treatment outcomes. The NIDA expert panel favored biological measures as more reliable than self-reports, and implied that being AOD free is a reasonable common denominator for successful treatment (Bühringer, 2012; Donovan et al., 2012).

A sub-panel derived from the NIDA expert panel voiced objections to the larger export panel's recommendations as incomplete (Tiffany et al., 2012). The sub-panel recommended the inclusion of quality of life measures, social integration, and harm-reduction outcomes as meaningful outcome measures in addition to the primary biological and self-report measurements (Tiffany et al., 2012). In anticipation of these objections, the NIDA panel judged these additional outcome measures problematic in terms of reliable measurements via self-reports, varying cultural definitions of what constitutes well-being and social integration, and the questionable role of symptom reduction based on the DSM-IV or WHO diagnostic criteria of AOD problems (Bühringer, 2012).

Commenting on the NIDA outcomes debate, Del Boca and Darkes (2012) suggested that outcome measures should match the goals of the interventions under study. Thus, short-term detoxification programs should be evaluated differently than long-term community-based models of treatment, and that these approaches represent two of many treatment modalities on a continuum (Hser & Anglin, 2011; Ridgway & Zipple, 1990).

An equally controversial side of the "recovery" and treatment outcome debate concerns AOD relapse. Relapse rates vary greatly depending on the treatment goals, definition of relapse, addiction severity, type of substance(s) used, and elapsed length of sobriety outcome period. In general, researchers have conceptualized post-treatment relapse among study participants in two ways: any failure to remain completely abstinent, or failing to adhere to any number of post-treatment maintenance behaviors (Connors, Maisto, & Donovan, 1996; Marlatt & Donovan, 2005).

Miller (1996b) rejected the notion of relapse and recovery as a simplistic either/or dichotomy because it fails to capture the continuum of severity and remission that occurs during the course of substance use and treatment. Like many other medical conditions that require time to respond to treatment, an individual's substance use, treatment progress, and treatment setbacks are complex, and dichotomous labels fail to capture this complexity (Del Boca & Darkes, 2012; Sheedy & Whitter, 2009). Outside of the United States, particularly in Western Europe, where

harm reduction and risk management is the most common treatment modality, researchers and clinicians sometimes refer to sobriety as unrealistic, or potentially harmful (Ashton, 2008).

It is not the intention of this study to endorse one view of recovery or relapse over another; controversy and philosophical disagreements regarding the goals treatment and long-term care are likely to continue (Bühringer, 2012). However, the author agrees with Del Boca and Darkes (2012): outcome measures should, sensibly enough, match the goals of the interventions under study. In addition, the author agrees that various treatment modalities represent a continuum of care that should match the needs of the individual in recovery.

Complete abstinence is the organizing principle around which many self- and mutual-help movements are based, which includes Alcoholics Anonymous and Oxford House (AA World Services, 1957; Oxford House Inc., 2006). Oxford House is an abstinence-based program, and the data from the parent study used abstinence as one of the primary measurement outcomes (Jason et al., 2007a), and that relapse must precede an eventual return to AOD re-treatment (Miller, 1996b).

Therefore, for the purposes of this study, the triggering event for this survival analysis is defined as using any alcohol or substance as measured on the Form-90/Timeline Follow Back (Miller, 1996a). The Form-90 provides a grid-averaging method to assess consistent drug use patterns from week-to-week as well as a continuous record of alcohol and substance use status throughout the course of a program. The Form-90 facilitates time-to-event analyses within a study, thus making it amenable to survival analysis (Singer & Willett, 2003). In addition, any drinking or drug-using episode in an OH requires the person to leave the OH and therefore exit from the study.

The Need for Post-Treatment Aftercare

People in AOD recovery can improve their chances to maintain sobriety after treatment by seeking social support for abstinence and by living in environments that are protective against AOD using behaviors (Jason, Olson, Ferrari, & Davis, 2003; Moos, Nichol, & Moss, 2002). Lack of social support networks and exposure to risk-prone environments are two major factors

in AOD relapse (DiClemente, Schlundt, & Gemmell, 2004; Gossop, Stewart, Browne, & Marsden, 2002; Jason et al., 2007a; Marlatt & Donovan, 2005; Walton, Reischl, & Ramanathan, 1995; Westhuizen, 2011). In a decades-long study, Rosenquist et al. (2010) found that people consumed more alcohol when relatives and friends were also heavy consumers of alcohol. Zwiak (2002) found that relapse to alcohol use was more likely when recovering individuals maintained close relations with friends who continued to use alcohol. Conversely, individuals who form supportive relationships with others, particularly peers with that offer abstinence-specific social support, experience fewer relapse episodes (Groh, Jason, Davis, Olson, & Ferrari, 2007; Longabaugh, Beattie, Noel, & Stout, 1993). These findings suggested that changing from a AOD using to a non-using social network serves as a protective factor for recovering individuals who wish to avoid relapse.

In many U.S. communities, recovering individuals obtain social support for abstinence at meetings of Alcoholics Anonymous (AA), Narcotics Anonymous (NA), or other 12-step groups. Although AA or NA groups do provide social support to help maintain abstinence, dosage is typically limited to 1-hour meetings; thus the length of exposure to supportive peers is limited (AA World Services, 2005). In addition, the availability of meetings varies greatly by municipality. For example, the Chicago metropolitan area has over 5,000 AA and NA meetings per week. In Peotone, a rural community 1.5 hours south of Chicago, has only two meetings per week (Chicago Area Service Office, 2011). As such, the exposure to supportive networks and the time needed to join in ingratiate into supportive networks can limit the effectiveness of mutual help groups. Also, mutual-help groups do not provide housing, and are thus ill-equipped to be full-service, long-term, or immersive treatment environments (AA World Services, 1984).

Even if using mutual help groups, many recovering individuals have no alternative other than to live in risk-prone environments after treatment. Risk-prone environments are those in which AODs are readily available; where social contacts are friends, family, and others using AODs; and/or environments in which illegal activities which support AOD use is common (McKeganey, Intosh, & Keganey, 2000; Moos & Moos, 2006b; Walton et al., 1995).

To overcome these limitations, many individuals choose to live in residential aftercare settings, which offer more services, offer long-term care, and are more immersive environments than mutual-help groups. Aftercare settings include halfway and three-quarter houses, residential recovery homes, and therapeutic communities (TCs) (Borkman, Kaskutas, Room, Bryan, & Barrows, 1998; Polcin & Henderson, 2008). Generally, the methods employed in aftercare settings are a combination of a structured, rule-based environment, life skills enhancement, peer interaction and support, and gradual engagement with the larger community (Brown, Seraganian, Tremblay, & Annis, 2002; Jason et al., 2007a). Although settings differ widely in terms of staff control, resident involvement and governance, levels of support, and services offered, the general goal of aftercare settings is to prevent relapse to problematic AOD use (Ekendahl, 2007; Rychtarik, Prue, Rapp, & King, 1992; Westhuizen, 2011; White & Godley, 2003).

The Oxford House Model

Again, the barrier for many people recovering from AOD problems are lack of adequate resources to sustain an AOD-free lifestyle: support for abstinence, and safe, non-using environments in which to live after primary treatment has ended. Oxford Houses are a model of residential recovery homes that provides both social support and AOD-free housing. Created in 1975 in Maryland, Oxford Houses are self-run, single-gender, non-professional communal recovery homes for people in AOD recovery. Oxford House takes its name from (but has no affiliation to) the Oxford Group, an evangelical Christian group that was the immediate precursor to Alcoholics Anonymous (AA World Services, 1957; Oxford House Inc., 2006). In its most common form, an Oxford House is a rented, single-family house in which 5 to 12 same-gender sober individuals in AOD recovery live together as a communal entity (Oxford House Inc., 2004). The explicit goal of OH is to prevent relapse among its residents (Oxford House Inc., 2011a).

Oxford Houses are perhaps best conceptualized as a hybrid of both mutual-help groups and residential recovery settings. Like mutual-help groups, individual Oxford Houses share a recovery philosophy of complete abstinence. In addition, OH residents agree to behave a

common set of operating principles formalized by the umbrella organization, Oxford House World Services, Inc., as well as house-specific operating rules and procedures. On entering an OH, residents are informed of OH rules and principles, obligations and procedures, but are expected to maintain complete abstinence from AOD using methods best suited to their own needs. Although OH principles for recovery generally suggest that most OH residents attend self-help groups, many residents also obtain psychiatric and therapeutic help of their own choosing, particularly if they have additional psychological problems (Aase, Jason, & Robinson, 2008; Majer, Jason, Ferrari, & Miller, 2011; Oxford House Inc., 2004).

To be an official or "chartered" Oxford House, residents must adhere to three criteria: 1) the House must be self-run on a democratic basis; 2) the House must be financially self-supporting; and 3) any resident who drinks alcohol of uses drugs must be expelled immediately (Oxford House Inc., 2011b, p. 5). An umbrella policy is that any recovering individual may live in an operational OH for as long as he or she wishes. In fact, the first "rule" agreed upon by the OH founders was to remove any restrictions on length of stay (LOS) (White, 2012).

Importantly, each Oxford House is part of a national network of sober residences following the same principles, and are remarkably similar in structure regardless of national or international location (Ferrari, Jason, Blake, Davis, & Olson, 2006a; Ferrari et al., 2006b). By some estimates, the OH model represents the most widely implemented aftercare program for former substance abusers in the world. Currently, there are over 1,600 OHs with over 12,700 residents worldwide, although the vast majority of OHs are in the United States (Oxford House Inc., 2012). Each year, Oxford House World Services, Inc. holds an international conference in which hundreds of current and former OH residents, leaders, and professionals attend to exchange experiences, obtain advice on house operations, and for general fellowship and friendship.

Unlike a staffed recovery home or TC, living in an Oxford House is not "treatment"; there are no professionals or therapeutic staff employed in the house, nor are there services offered or "therapeutic program" to follow. Similarly, there is no staff employed at an OH to

administer and maintain the house. Instead, all functions are performed by residents five house resident-officers (president, treasurer, comptroller, secretary, and chore coordinator) who are elected every six months by house majority vote (Oxford House Inc., 2004). Thus, every OH resident is involved in maintaining the house, and chore duties and officer positions rotate among all the house residents.

Oxford Houses are not sequestered environments in isolated locales. Most OHs are located in mainstream urban and suburban communities because these locations offer a full range of services for living and working (Ferrari, Groh, & Jason, 2009). These locations typically have access to public transportation, grocery and food stores, restaurants, recreation, and shopping. Also, living in ordinary homes allows OH residents to interact with neighbors as members of the community rather than as patients. In addition, OH locations also provide OH residents with choices to attend 12-step meetings, therapy, or other treatments per the discretion of each resident (Oxford House Inc., 2004).

Jason et al. (2003) performed a qualitative case study of the operational practices and policies of a men's OH in Northern Illinois. Jason et al. found that this OH shares characteristics with mutual-help groups by its processes of self-governance and emphasis on self-motivation for recovery. However, Oxford Houses differs from mutual-help groups by providing continuous support, housing, and a clear set of sanctions for using AODs while living in the house.

Of Oxford House residents in the USA, three-quarters are male and one-quarter female, and approximately one-third are African American (Oxford House Inc., 2011b). The average age of the residents is 32.5 years. Half of Oxford House residents come directly from a detoxification program or a treatment center, although many learn of Oxford Houses through the OH website search (http://oxfordhouse.org/locate_houses.php), and word-of-mouth referrals from AA, NA, and other 12-step meetings. Oxford Houses exist for men and women both with and without children, houses for the hearing impaired, those with serious psychological disorders, are Spanish-speaking, and in both urban and suburban environments (Jason et al., 2007a). In addition, current and ongoing studies also indicate Oxford Houses have a positive impact on

reducing aggressive and criminal behavior (Aase et al., 2008). Finally, self-run and self-financed OHs can provide services at much lower costs than professionally run acute- and chronic care facilities, as well as prison-based treatment systems (Olson, Viola, Jason, Davis, Ferrari, & Rabin-Belyaev, 2006).

Groh et al. (2009) summarized that regular treatment and 12-step meetings (e.g. Alcoholics Anonymous, Narcotics Anonymous) produced sobriety rates of 45%, while living in an Oxford House can produce sobriety rates of 87% when combined with treatment and 12-step meetings. Other researchers found evidence that the availability and use of stable after-care living arrangements and social support encouraged abstinence and predicted fewer relapse episodes (Hitchcock, Stainback, & Roque, 1995; Moos, 2003b). The experience of shared living spaces and mutual dependence offered multiple benefits: increased mutual-help participation can increase social support (Humphreys, Mankowski, Moos, & Finney, 1999) which is associated with better abstinence (Moos & Moos, 2006a). Research indicated that living in an Oxford Houses provided daily, long-term exposure to social supports that were effective in preventing AOD problems relapse beyond twelve-step meetings (Jason et al., 2007a). Thus, the Oxford House model combined characteristics of residential therapeutic communities by providing long-term housing, and with mutual help groups via processes of self-governance and self-support.

An obvious, if sometimes overlooked, advantage of residential aftercare is that they provide housing for a population that often experiences chronic homelessness while using AOD (Des Jarlais, Braine, & Friedmann, 2007; Orwin & Garrison-Mogren, 1999). It is difficult to obtain reliable national statistics on homelessness among adults recovering from AOD problems. However, surveys taken from Oxford House (OH) residents in the United States (the aftercare program that is the focus of this study) indicates that 63% of residents were homeless prior to living in their OH, and approximately 79% of OH residents have served time in jails or prisons (Oxford House Inc., 2011b).

However, the OH movement struggles to maintain a balance of organizational independence while accepting some financial assistance from state government. At the 2010

Oxford House World Convention in Chicago, IL, the author witnessed a conference-wide debate regarding admitting residents into OH while being treated with methadone or other substitution treatments. A resolution was passed allowing each individual house to decide whether to admit residents taking methadone, provided that the house residents discuss and reach these decisions democratically per the OH charter rules. However, many new OHs are created via revolving loan programs administered by individual states. These loans cover the start-up costs of new OHs, which must be paid back over two years. Some states, such as Oregon, have begun to mandate that each new OH created with state funds accept residents treated with methadone, as well as traditionally abstinent individuals (Korn, 2013). It remains to be seen what impact, if any, state-mandated requirements will have on the functioning and self-governance of OHs in the USA.

In sum, OHs are drug-free settings that have similarities with mutual support groups such as AA and NA, half-way and three-quarter houses, residential recovery homes, and therapeutic communities (Borkman et al., 1998; Polcin & Henderson, 2008). Like a residential TC, OH provides housing facilities and a structured environment, but differs from most TCs because OHs operate without professional or administrative staff and without a maximum LOS requirement (Ferrari, Jason, Davis, Olson, & Alvarez, 2004; Harvey & Jason, 2011; Jason, Olson, Ferrari, & Lo Sasso, 2006). The combination of supportive sober living environments with other recovery resources seems to have a powerful protective effect against relapse. What follows is a summary of the psychological processes that might be activated by living in an OH environment.

Theoretical Factors That Promote Recovery in an Oxford House

Mutual-help behavior occurring in a group setting has become a major area of addiction research (Barrows, 1998; Borkman, Kaskutas, & Owen, 2007; De Leon, 2004; Finney, Wilbourne, & Moos, 2007; Forys, McKellar, & Moos, 2007; Groh et al., 2007; Humphreys et al., 1999; Jason et al., 2006; Khantzian & Mack, 1994; Moos, 2003a). Over the past several decades, researchers have made significant progress in understanding the theoretical processes in social settings that are protective against relapse and encourage long-term remission from AOD problems (Finney et al., 2007). In general, the most effective interventions address the entire life

contexts of the person in recovery (Moos, 2003a). The next section describes the theoretical psychosocial processes that appear to promote sustained recovery from AOD problems.

Moos (2011) describes these processes as the four theoretical "active ingredients" that are essential in treatment settings to promote recovery from AOD problems: stress and coping, behavioral economics, social learning, and social control. Although Moos (2011) proposes these are the likely active ingredients, it is not yet known in what quantity, duration, dosage, and emphasis are necessary for each of these ingredients to promote long-term sobriety. The four theoretical ingredients are described below in general, and in the context of living in an Oxford House.

Social control. Social control processes affect the bonds an individual forms with others while living in a treatment setting. Social bonds emerge when the activities occurring within the setting enhances cohesion and mutual support among participants, establishes clear direction and common goals, and encourages non-coercive mutual monitoring and accountability (Moos, 2011). In an OH setting, residents establish social bonds by agreeing to adhere to a common recovery philosophy, democratic decision-making on house-wide issues, sharing responsibilities for maintaining and sustaining the house, and participating in a rotating leadership structure. In addition, peer-governance and the lack of professionals or an individual authority tend to create a more supportive, cohesive environment than even peer-managers in other recovery environments (Harvey & Jason, 2011). The bonds that form among OH residents provide a mechanism for behavior monitoring and corrective feedback, which encourages positive interactions among fellow residents and possibly with others in non-OH recovery settings.

Social learning. Based upon Bandura's (1997) work on self-efficacy, social learning involves imitation of positive role models and following acceptable norms. The OH system of communal living and room-sharing policies prevents individuals from isolation and encourages closeness, providing a milieu in which to observe and imitate positive, non-using behaviors. OH residents often share common recovery experiences, and diversity of resident's ages, length of recovery, and background tends to provide rich learning opportunities in a naturalistic, yet

purposeful recovery-oriented environment. Over time, shared experiences expose residents to positive role models to emulate – particularly peers who have had similar experiences solving practical and personal problems (Harvey & Jason, 2011). In addition, mandatory participation in house business and operations means that more experienced residents will often instruct newer residents (explicitly or by example) how to meet these responsibilities. OH residents are required sign a contract agreeing to the rules and regulations of the OH. Social learning is thus encouraged by explicit expectations of behaviors expressed in OH rules, and clearly defined consequences for violating these rules and norms, thus providing a mechanism for learning and mutual reinforcement.

Behavioral Economics. Behavioral economics theory (also called behavioral choice theory) refers to the rewards people in recovery experience from conventional activities as an alternative to using substances (Moos, 2011). Rewarding activities might include friendship and fellowship within a mutual-help group, non-using recreational activities, obtaining employment to attain self-sufficiency, and discovering (or re-discovering) religious affiliations and activities. Behavioral economics is a cornerstone in community reinforcement approaches (CRA) which is based on the etiology that AOD problems develop out of patterns of reinforcements (Meyers & Miller, 2001). CRA is a model which attempts to reverse the reinforcing properties of substance use to abstinence by creating immersive environments that highlight the rewards of drug-free living.

In an OH environment, behavioral economic processes are activated via the rewards gained from not using substances (access to a comfortable place to live, fellowship, and friendship with co-residents) gradually become more attractive than substance use and its potential loss of a safe, supportive home. Because OH are situated in mainstream communities (as opposed to sequestered, total immersion environments such as TC), these activities might include and extend to other persons, such as friends, family and to other environments such as work, 12-step groups, or religious institutions (Marlatt, Tucker, Donovan, & Vuchinich, 1997). Although rewards are emphasized, behavioral economic theory also highlights explicit

consequences of using. In an OH context, using AOD means immediate eviction from the house, and sanctions for not performing specific house duties in a timely or acceptable manner (Oxford House Inc., 2004).

Stress and Coping. Stress and coping processes involve identifying and effectively managing stressors and high-risk situations, as well as developing effective coping strategies and building self-efficacy (Moos, 2011). Much of Marlatt's relapse taxonomy (Marlatt, 1996) relies on stress and coping theory. Briefly, Marlatt's relapse taxonomy states that relapse occurs as a response to a risky situation (including emotionally stressful situations) for which the person in recovery lacks certain cognitive and/or emotional skills in which to cope successfully with the situation. Sobriety itself can be stressful – particularly early sobriety – because of a loss of using substances as a coping strategy, and because of facing problematic consequences as a result of past substance use. Early sobriety typically involves stressful financial or legal troubles, problematic interactions with family, friends, and peers, undiscovered positive substitutions of using behaviors, and limited opportunities for work and community reintegration from (Brownell, Marlatt, Lichtenstein, & Wilson, 1986; Drake, Wallach, & McGovern, 2005; Freudenberg, Daniels, Crum, Perkins, & Richie, 2005; Miller, Westerberg, Harris, & Tonigan, 1996; Xie, McHugo, Fox, & Drake, 2005). In OH living, fellow OH residents who are more experienced can act as a source of information, experience, strength, and hope by sharing stories of handling similar stressors. These OH residents can share experiences of positive alternatives to reduce stress, and the self-confidence needed to face problems and successfully learn stress and coping skills. Further, the application of skills required to live in an OH map directly onto previous research into specific treatment activities that improve participants stress and coping abilities (Forys et al., 2007).

Common Themes among the Theoretical Ingredients

There appear to be a number of temporal, structural, social, and environmental factors that influence the activation of these theoretical ingredients. These "binders" hold together the

psychological processes together and allow them to contribute to sustaining abstinence in an OH setting.

First, all of these processes are time dependent. Most researchers acknowledge that these ingredients need time to integrate into the context and lifestyle of each individual in AOD recovery (Beattie & Longabaugh, 1999; Borkman et al., 1998; De Leon, 2000; Meyers & Miller, 2001; Moberg & Finch, 2008; Moos, 2003a). For example, a minimum amount of time among peers is needed to form friendships and bonding relationships, although measuring the time needed for this process is difficult to establish empirically (Vaillant, 1995). When a new OH is created with a group of new residents, the social bonds among these residents have not yet formed and are weak or unstable; Beasley et al. suggested that instability was a result of residents being relatively unfamiliar with each other, and had yet to share common experiences within the house (Beasley, Jason, Miller, Stevens, & Ferrari, 2013). Thus, social control processes appears to be time dependent.

Social learning and behavioral economics processes are also time dependent. A new resident might wish to be free of the obligation to perform housekeeping duties that are required for the privilege of staying in the OH. These obligations may not be present in an independent living arrangement, or in a staffed TC. Moreover, these OH obligations apply equally to long-term OH residents, a new OH resident with some established sober time, or a resident sober for the first time. Over time, learning how to live with other and to perform meaningful, mutually obligated duties in the context of a non-using lifestyle becomes commonplace. Similarly, the behavioral costs of using substances, thus precipitating removal from the house resulting in possible homelessness, become less attractive.

The environment and structure of OHs are also instrumental to encourage bonding via the daily transactions and interactions that occur among residents. Because OHs are shared living spaces, people living in OH cannot isolate from co-residents (Ferrari, Jason, Olson, Davis, & Alvarez, 2002). This encourages meaningful interactions, which fosters social learning and forming social networks. Also, because shared responsibilities require residents to rely on each

other for financial as well as to solve personal and practical problems, each resident becomes more involved in their OH's functioning as compared to a staffed TC setting (Harvey & Jason, 2011).

All four theoretical processes are related to the theory of social support as outlined by Longabough and colleagues (Beattie & Longabaugh, 1999; Longabaugh et al., 1993). In fact, all these theoretical ingredients could be conceptualized as being both specific to abstinence social support and general social support. For example, Marlatt and Donovan (2005) emphasized the need for recovering individuals to learn both general coping and substance-specific coping skills to protect against relapse. These ideas are in congruence with Moos' contention that effective treatments and treatment environments are those which help people fully adapt to their unique life circumstances (Moos, 1996). In a series of qualitative interviews with individuals in various stages of recovery (N=356), Laudet and White (2010) found that daily life – relations with family, friends, employment, and housing – were often the most challenging aspects of maintaining sobriety. Given that one of the goals of recovery is participation in everyday life, learning skills that are specialized to promote sustained adherence to a treatment regime are likely to be less effective without a generalized coping and learning components (Moggi, Ouimette, Moos, & Finney, 1999).

In sum, the OH system of social support for recovery while providing housing seems to "activate" all four theoretical processes in abstinence-specific and general social support via the everyday interactions of its residents. Each of these theoretical processes provides a conceptual framework in which to understand why scores on a particular variable of instrument might have a positive effect on long-term sobriety (e.g. Perceived Sense of Community and Social Control theory). Therefore, the use of survival analysis in this study could begin to address these questions. The relationships between the instruments and variables used in the NIDA study and these theoretical processes are described below.

Substance use disorders develop within a complex interaction of structural, biological, social factors. As such, AOD use and treatment outcomes are influenced by many psychosocial

and structural factors associated with the demographic characteristics of the individual. However, it is important to be explicit that the relationship between demographics and AOD problems are neither causal nor direct. Exogenous demographics are often mediated by resource needs based on gender or age (Walton, Blow, Bingham, & Chermack, 2003). However, it is important to understand which demographic factors are related to AOD relapse rates and time-to-relapse, and to examine the possibilities why these relationships occur. It is in this way that researchers and clinicians can better understand the unique circumstances to deliver and recommend appropriate continuum of care services to the individual.

Gender, Marital Status, Education, Housing, and Socio-Economic Variables

Gender and Marital Status. Most studies find that men relapse more often and sooner than do women (Xie et al., 2005). Xie and colleagues performed a ten-year prospective study of 223 individuals with co-occurring psychiatric disorders as well as SUDs. Demographic measures were taken at baseline. In addition, the participants were assessed at baseline and every six months over ten years on housing history, treatment utilization including institutional stays, quality of life measures, employment. Using survival analysis techniques on these data, Xie et al. (2005) found that 169 of the original 223 remained sober at six months. This number dropped to 117 at 1 year, 89 at 2 years, and leveled off at 2 years with 74 remaining abstinent. The predictors of relapse for this sample were gender (men being more prone to relapse than women), education (less than a high school education predicted higher relapse rates), living independently versus living in a group setting, and non-participation in ongoing SUD treatment.

A study by Walton et al. (2003) recruited 241 adults in their first month of inpatient SUD treatment to participate in a 2-year study of interpersonal and psychosocial factors relapsed to relapse. In addition to demographic variables gather at baseline, Walton et al. (2003) gathered information related to relapse risk which included measures of problem severity, self-efficacy, coping skills, situational confidence, and resource needs and available assets. In addition, quality of life scales regarding expectations for enjoyment in sobriety were measured. Among these 180 participants, 76.1% had relapsed at least once at the 2-year follow-up.

Walton et al. (2003) performed a path analysis to test two mediational models in which they predicted that exogenous demographic variables would be mediated by intrapersonal assets (self-efficacy). They found that lower income, being female, unmarried, and with more severe AOD problems predicted lower self-efficacy. Additional analyses indicated that poor self-efficacy, being unmarried, and having less income predicted alcohol and/or drug relapse.

Gender and Education. Most studies find that men relapse more often and sooner than do women (Xie et al., 2005). Xie and colleagues performed a ten-year prospective study of 223 individuals with co-occurring psychiatric disorders as well as SUDs. Demographic measures were taken at baseline. As indicated earlier, the predictors of relapse for this sample were gender (men being more prone to relapse than women), education (less than a high school education predicted higher relapse rates), living independently versus living in a group setting, and non-participation in ongoing SUD treatment.

Age. Bishop et al. (1998) conducted the first (and until this study, only) survival analysis of OH residents to date to determine what factors lead to residents leaving their OH. Although the present study and Bishop et al. (1998) both use survival analysis techniques, Bishop et al. (1998) was significantly different from that of this study. First, Bishop et al. (1998) looked at the important relationship between sense of community and resident's decision to leave their OH. As such, the triggering event for Bishop's study was leaving their OH and not AOD relapse or any measure of sobriety. Although LOS in OH is a crucial factor in overall success in reducing drinking and drug-taking behavior, and Bishop's early study was an important piece in the puzzle addressing the LOS in OH question, it did not look at specific relapse outcomes. Second, Bishop et al. (1998) was a study of 129 men living in 11 OHs in Illinois. In contrast, the present study used a national sample of 268 men and women residents of OHs; as such, this study is a more representative sample of U.S. OH residents.

Pertaining to the current study, Bishop et al. found that older residents (M=38.0 years) living with similarly older cohorts tended to have longer mean LOS in days (M=196, or 6.5 months) in an OH setting than younger residents (M=31.8, M=156 days, or 5.2 months).

Participant age and LOS are crucial factors, as prior research found that stays of six months or longer in OH tended to reduce AOD use.

Therefore, this study expected to find that younger individuals will be at greater risk of and experience more relapse and shorter time-to-relapse than older OH residents. Bishop et al. also found that African Americans tended to stay in OH longer than Whites, although this study will not make specific hypotheses to examine the relationship of ethnicity and AOD relapse.

Previous treatment and Longer Episodes of Treatment

Early research on residential treatment settings indicated that LOS in treatment and aftercare yielded contradictory results (Moos, Finney, & Cronkite, 1990). Systematic evaluations of large-scale treatment programs, such as the Drug Abuse Treatment Outcome Studies (DATOS) carried out in 1991-1993, as well as the earlier Treatment Outcome Prospective Study (TOPS) concluded that the most consistent predictor of positive outcomes in community-based settings are client retention and LOS (Etheridge, Craddock, & Dunteman, 1995; Simpson, 2004). Longer LOS predicted higher sobriety rates in both naturalistic, non-experimental studies (Hubbard, Craddock, & Anderson, 2003) as well as experimental studies with randomly assigned controls or comparison groups (Dearing, Barrick, Dermen, & Walitzer, 2005; Jason, Olson, Ferrari, Majer, Alvarez, & Stout, 2007b).

However, McCusker and colleagues (1995) found that longer LOS in treatment had no beneficial effect than shorter LOS. McCusker and colleagues (1995) assigned participants (N=628) to one of two inpatient residential TC programs: one TC program was modified to emphasize relapse prevention and health education in which clients were randomly assign to 3- or 6-month programs. The other condition was a 6- or 12-month program in a traditional TC (McCusker et al., 1995). All groups had the same 6-month post-treatment drug use outcomes ranging from 50% to 56% sobriety rates from drugs (alcohol use was not measured as an outcome).

It is unclear what duration and retention rates in a setting constitutes an effective LOS, and what client characteristics influence this relationship (Condelli & Hubbard, 1994; Finney,

Moos, & Chan, 1981). The TC literature describes three stages of the therapeutic process based on time: Stage 1 – Induction (from entry to two months); Stage 2 – Primary Treatment (two months to 12 months), and Stage 3 – Re-entry (12 to 24 months) (De Leon, 1989, 2000). De Leon (2000) reported that drop-out risk is highest during the first thirty days of Stage 1.

Moos et al. (1995) found that patients (N = 5,176, mostly males) who entered a long-term aftercare facility after acute or short-term AOD treatment had ended had lower treatment readmission rates after 6 months and 1 year than treated men (N = 5,176) who were released back into the community, often returning to their homes (Moos, Pettit, & Gruber, 1995). The men who entered the aftercare facility also used outpatient mental health care services significantly more than men released into the community. Moos et al. suggested that longer episodes of care tends to encourage active participation and involvement with mental health and recovery processes, such as more frequent office visits and meeting with recovery counselors.

High turnover within a treatment environment might be a key component to extending resident LOS and subsequent benefits of longer treatment. In the McCusker et al (1995) study, they found that retention rates decreased over time, ranging from 55.6% for the 3-month program to only 20.7% for the 12-month program, i.e. the longest episodes of treatment had the lowest completion rates. However, all groups had the same 6-month post-treatment drug use outcomes ranging from 50% to 56% sobriety rates from drugs.

These findings suggest that longer stays are effective only if it permits opportunities for residents to become engaged in the setting, and thus activate the protective social benefits from Moos' theoretical ingredients. Length of stay contributes to the "activation" of the theoretical ingredients because many of these processes are time based, i.e. a 6-month program offers more opportunities to learn from peers, or to form friendships and to bonds with others, than does a 30-day program.

Shorter LOS was found to increase likelihood of relapse in previous Oxford House studies. When follow-up interviews were conducted at the end of the 2-year study, Jason et al. found that residents staying less than six months in an OH had relapse rates of 45.7%. OH

residents who stayed more than six months had relapse rates of just 16.6% (Jason et al., 2007b). These findings suggested a tipping point of six months of OH residency were required for the protective against relapse. Stays of six months or less in an Oxford House indicated that induction and/or primary treatment has yet to take hold, thus leading to higher relapse rates. In general, TCs have more structured and formalized policies, and that OHs tend to emphasize more freedom and autonomy (Ferrari et al., 2004; Harvey & Jason, 2011). Also, it can be argued that the OH's placement in mainstream communities, work and financial requirement, and dependence on resident self-governance combines Stage II treatment as well as Stage III re-entry. Greater LOS of six months or more may allow individuals to stabilize and adapt to their post-treatment circumstances at a self-defined pace (Jason, Ferrari, Smith, Marsh, Dvorchak, Groessl, Pechota, Curtin, Bishop, Kot, & Bowden, 1997). Other studies have also noted that treatment durations of 6-months or more tend to produce better outcomes in residential settings (Dennis, Scott, & Foss, 2003; Hubbard et al., 2003; Johnson, Finney, & Moos, 2005). Also supporting this contention are studies comparing programs lasting from 14 to 90 days which found no differences in sobriety outcomes based on LOS (Etheridge et al., 1995).

From the perspective of the four theoretical ingredients described earlier, it might be that LOS, client retention, and client participation underscore the concept that length of contact with peers, rather than program length alone, is necessary for positive outcomes. That is, residents with longer LOS within a relatively stable social group will experience repeated contacts with peers, will form initial friendships, and eventually strong, bonded relationships. These bonds create a degree of intimacy and trust with others, which are necessary to alleviate stress and learn coping skills. Similarly, longer LOS and consistent contacts with role models are necessary for social learning and the friendships and benefits that accrue during longer LOS strengthens behavioral economic incentives to remain in the setting. Contact with an unstable social group might be less likely to produce similar benefits.

Past research indicates that an Oxford House resident's likelihood of experiencing AOD relapse is related to their LOS in the OH (Davis & Jason, 2005; Jason et al., 2007a). Specifically,

this research found significant differences in outcomes for individuals who stay longer than six months in an Oxford House as compared to those who stay for less than six months. Similar to research in other settings LOS is predictive of an Oxford House resident's probabilities for sustained recovery.

In sum, research supports that residents who living for longer periods in AOD aftercare settings tends to reduce relapse and remission rates, and that it is time in the setting - rather than intensity of care or number of services offered in a setting - that has the greater impact (Finney et al., 2007).

Therefore, this study expected to find that individuals who stayed in treatment and were sober for longer periods prior to living in an OH will have a positive impact on survival rates and time to relapse than those with shorter episodes of treatment or no prior treatment. Similarly, it is expected that LOS in OH to be positively associated with longer survival rates in OH, and that the highest risk for relapses would occur in earlier waves or the study.

Substance abuse disorders with co-occurring psychiatric disorders

National studies in the United States indicated that between 33% and 60% of individuals seeking treatment for AOD problems also have non-substance related psychiatric disorders requiring treatment (Grant, Stinson, Dawson, Chou, Dufour, Compton, Pickering, & Kaplan, 2004). This characteristic is also applicable to OH residents; in a study of OH residents in the Midwest, 52% reported multiple psychiatric disorders, whereas only 21% reported no psychiatric disorders at all (Majer, Jason, Ferrari, & North, 2002). The high prevalence of pre-existing psychiatric disorders among people with AOD problems has been cited as a primary cause for developing AOD problems in the first place (Khantzian, 2003; Suh, Ruffins, Robins, Albanese, & Khantzian, 2008). People with AOD problems and dual or comorbid psychiatric conditions are sometimes called dual diagnosed individuals (DDIs).

Similar to non-comorbid individuals in AOD recovery, DDIs also benefit from social support processes in AOD recovery settings (Aase et al., 2008). Laudet and colleagues have studied the intersections of self-help, social support, and AOD problems with co-occurring

psychiatric disorders over the past decade (Laudet, Cleland, Magura, Vogel, & Knight, 2004a; Laudet, Magura, & Cleland, 2004b; Laudet, Magura, Vogel, & Knight, 2000; Laudet, Morgen, & White, 2006). Laudet and colleagues consistently found that dual-diagnosed individuals benefit from (and are possibly more vulnerable to lack of) environments that offer social support, such as dual-focused self-help groups as well as single-substance 12-step groups. These findings were consistent in prospective studies which followed participants for up to 2 years after initial treatment (Laudet et al., 2004a). Majer et al.(2008) found no differences in abstinence rates in a national study of 415 OH residents who were dichotomized into high- and low-severity based on scores of a psychiatric severity index. Unfortunately, Majer et al. (2008) did not compare abstinence rates between these two groups and OH residents who reported no psychiatric disorders.

Comorbidity has been found to be an additional risk factor for AOD relapse in numerous studies (Kushner, Abrams, Thuras, Hanson, Brekke, & Sletten, 2005; Langdon, Yágüez, Brown, & Hope, 2001; Laudet, Magura, Vogel, & Knight, 2004c). Langdon et al, (2001) reviewed the characteristics of clients in repeated AOD problem treatments in the U.K. and found that comorbid psychological disorders to be among the strongest predictors of relapse and re-admission. In a study of 53 substance abuse treatment participants, Kushner et al. (2005) found that clients with comorbid AOD problems and anxiety (55% of their sample) relapsed more frequently in a 4-month post-treatment follow-up than those assessed with AOD problems alone at baseline. Kushner et al. concludes that pre-screening for comorbid disorders such as anxiety and depression should be used as a marker for potential relapse relative to singly diagnosed clients.

Thus, this study expected lower psychological comorbidity scores at entry to OH to be associated with fewer relapses and longer survival rates in OH.

Employment and Income

Even in times of relative prosperity, people with AOD problems have severe employment difficulties. For example, in 2006, only 3% of the overall U.S. population were unemployed, and

22 percent were not in the labor force (Substance Abuse Mental Health Services Administration, 2008). Yet, in 2006, only 31% of adults between the ages of aged 18 and 64 entering substance abuse treatment facilities were employed; 33% were unemployed, and 36% were not actively involved in the labor force (Substance Abuse Mental Health Services Administration, 2008). It is likely that these employment figures have worsened for those entering treatment since the beginning of the U.S. economic recession beginning in 2008.

After treatment, low rates of employment or difficulties finding work have been associated with AOD relapse (Baldwin, Marcus, & De Simone, 2010; Rabinowitz, Mark, Popper, & Slyuzberg, 1995; Slaymaker & Owen, 2006). Employment is tightly bound with AOD problems, as employment provides an activity that limits the number of hours that would otherwise be idle and possible triggers for substance abuse (Kemp, Savitz, Thompson, & Zanis, 2004). In addition, employment provides a number of psychosocial effects such as a legal source of income, increased self-esteem and self-efficacy, autonomy, and better functioning and increased skills in daily living as well as on the job (Reif, Horgan, Ritter, & Tompkins, 2004), and that can reduce relapse (Rabinowitz et al., 1995).

Conversely, obtaining gainful employment after treatment has been found to be one of the best predictors of AOD treatment success (SAMHSA, 2000). However, few AOD treatment studies view employment as an outcome variable (Room, 1998). There are exceptions. In a 24-month study of 150 participants randomly assigned to either Oxford House or usual aftercare (UA), Jason et al. (2007b) found that OH residents had significantly higher employment rates after six months and through the remainder of the study. More dramatically, they found that younger residents under 36 years old who stayed in an OH longer than six months had employment rates of 93.8% versus 56.3% for the UA condition. Providing employment training or job-search assistance has been shown to improve AOD outcomes among nationally representative samples (Reif et al., 2004), for ex-offenders (Kemp et al., 2004), and for veterans with AODs (Rosenheck & Seibyl, 1997).

Thus, it is expected that an employment composite measure of wages and length of employment would be positively associated with survival rates such that higher wages, and/or longer episodes of employment at baseline would result in fewer relapse and longer survival times among OH residents.

Alcohol and Drug Abstinence Self-Efficacy

Self-efficacy is an individual's belief about themselves that they can perform a behavior, achieve a goal, or to resist temptation or influence (Bandura, 1997). Self-efficacy is a cognitive-behavioral concept which Bandura (1977) first hypothesized is a central mediating factor in human behavior – if one believes he or she can carry out a behavior, the greater the likelihood that person will succeed in doing so. According to self-efficacy theory, individuals in AOD recovery should remain abstinent longer if they believe they have enough personal agency to produce or resist actions to achieve desired effects or to resist undesired behaviors, and that continued efforts can overcome setbacks and difficulties (Bandura, 1997). There are two basic components to AOD self-efficacy: the ability to engage in and maintain health-promoting behaviors, and the ability to cope and resist stress responses (Maddux, Brawley, & Boykin, 1995; O'Leary & Brown, 1995).

In addiction research, both components serve as protective factors against AOD relapse (Donovan, 2003). Greater levels of personal self-efficacy enable individuals to engage in pro-social behaviors and to withstand vulnerability, such as life stressors, temptations, and cravings for AOD. This is called abstinence self-efficacy - (Ilgen et al., 2005) (DiClemente, Carbonari, Montgomery, & Hughes, 1994) (Rychtarik, 1992).

To test the stress-relapse hypothesis, Brown and colleagues (1995) examined the relationship between significant life adversity, psychological vulnerability, and AOD relapse by analyzing archival data from a selection of 300 men entering a 4-week inpatient treatment program for chronic alcohol problems. Of these 300 men, 67 were selected who had experienced high-threat events of ongoing life difficulties over a year period. Vulnerability was operationalized as a measure of coping skills to resist stress, levels of abstinence self-efficacy,

and levels of social support. Vulnerability scores were measured at intake, 3-months after treatment, and at one year, with the relapse status taken at 3 months and at one year. Of the 67 men, 56% (n=37) relapsed during the year. There were no differences in vulnerability scores between the relapse and non-relapse groups at intake. However, Brown (1995) found significantly higher levels of self-efficacy at three months for the abstainers than the relapse group, and abstainers had increased their self-efficacy scores from baseline to three months, while the relapse group's self-efficacy scores decreased. Brown (1995) concluded that effective coping resources – self-efficacy and good social support – moderated the effects of significant life adversity that lead to lower relapse rates. Further, self-efficacy uniquely accounted for 30% of the variance in AOD relapse.

A number of OH studies looked at the effects of self-efficacy with OH residents. For example, (Majer, Jason, Ferrari, Venable, & Olson, 2002) conducted a study of 100 OH residents to examine the relationship between peer identification (veteran status, parent, and ex-offender), social support, and abstinence self-efficacy. Although residents who had peer identification issues tended to report lower self-efficacy as assessed using the Situational Confidence Questionnaire-39 (Annis & Graham, 1988), this study found that self-efficacy overall tended to increase the longer participants lived in their OH. Similarly, (Davis & Jason, 2005) found that longer LOS in an OH increased abstinence self-efficacy for 87 men and women OH residents. Interestingly, Davis and Jason (2005) found that the relationship between LOS in OH and self-efficacy was fully mediated by social support for drinking for the 38 women in their sample, but not the 49 men. This suggested that LOS in OH and abstinence self-efficacy processes were different for OH women residents compared to men.

Stevens et al. (2010) looked at the relationship of sense of community and its effects on self-efficacy among OH residents and found that the longer residents lived in OH, the higher the self-efficacy. Previous studies indicated that interventions designed to strengthen self-efficacy did lower relapse rates. However, no studies of gains in self-efficacy while living in naturalistic

settings such as OH have yet been conducted, and no OH studies to date have examined changes in self-efficacy over time and their relationship to AOD relapse.

Therefore, this study shall examine the changes in self-efficacy over time for new OH residents, and whether changes in self-efficacy for these residents affected time-to-relapse and longer lengths of sobriety. Because self-efficacy is characterized as a personal cognitive resource that fluctuates over time and circumstances, this study shall enter self-efficacy measures as a time-variant predictor across the four waves.

Predictors in the NIDA Data Set

Broadly, this study proposes that relapse events and the time to relapse outcomes are influenced by three factors: time-invariant demographic factors (age, gender, marital status, number of previous treatments, length of sobriety), time-invariant initial condition (employment status and employment income, number of previous treatments, psychological co-morbidity), and time-varying changes in alcohol and drug abstinence self-efficacy. The conceptual reason to categorize these variables is to consider the ways the theoretical ingredients interact with them. Put simply, observational learning requires time, and learning new ways to live sober requires time to have an impact the person's life (Khantzian & Mack, 1994).

The selection of data for the present study are driven in part by the requirements of discrete-time survival analysis as described more fully in the Methods section. First, time-invariant data gathered at baseline allows for an examination of the effects of demographic data – gender, education, age – have on survival rates. Also, baseline data regarding number of previous treatments, psychiatric co-morbidity, are also examined for their have on survival rates. Most of these data are taken from the *Addiction Severity Index-Lite* (ASI-Lite: McLellan, Kushner, Metzger, & Peters, 1992).

Standard discrete-time survival analysis methods require that time-variant data are gathered at all four waves. These data are from the Alcohol Abstinence Self-Efficacy scale and a slightly modified version of the AASE to produce the Drug Abstinence Self-Efficacy scale (DASE) (AASE: DiClemente et al., 1994).

The measure for the triggering event is any alcohol or drug-taking activity at each wave as self-reported from Miller and Del Boca's (1994) Form 90 Timeline Follow-back. These instruments are described in greater detail in the subsequent sections.

Rationale

Currently, it is unclear what factor or combination of factors affects time-to-relapse over time for newer residents entering OH. Although LOS is important, other studies have shown that demographic characteristics, employment, previous AOD severity, and AOD comorbidity with other psychiatric problems are also factors in AOD relapse in environments similar to OH.

To understand the relationship between AOD aftercare and relapse, this study shall explore what factor or combination of factors affect time-to-relapse among men and women who were living in long-term post-AOD treatment aftercare settings called OHs. In addition to these findings, this study contributes to the literature by examining a large national sample living in relatively homogenous OH settings over the course of one year. This dissertation also represents the first use of survival analysis techniques to analyze relapse occurrence among OH residents.

This study will also explore what characteristics about an individual affects the risk of their experiencing relapse, and if this risk increases or decreases over time. Is the risk for the *incidence* of relapse greater immediately after treatment has ended, or is there time when the risk of relapse increases after some length of time?

Statement of Hypotheses

Hypothesis I: *Three demographic variables - age, marital status, and level of education – will be significant predictors of hazard and relapse occurrence to a statistically significant degree. Specifically, participants who are younger, un-married, and with fewer years of education, will have significantly higher hazard function and will relapse events than older, married, and more educated peers.*

To test this hypothesis, a Cox-regression will be run using time as the independent variable, event as the dependent variable, and the variables age, marital status, and level of

education entered into the equation as covariates. The resulting hazard function and survival curves are compared against the baseline hazard function and survival curves. The null hypothesis is that the covariates introduce no significant differences in hazard and survival.

Hypothesis II: *Variables related to addiction severity – length of sobriety upon entry into the OH, number of previous treatments, and ASI alcohol, drug, and psychiatric severity composite scores – will be significant predictors of hazard and relapse occurrence to a statistically significant degree. Specifically, participants who have shorter lengths of sobriety, more previous treatments, and higher ASI composite scores for alcohol problems, drug problems, and psychiatric problems, will predict a significantly higher hazard function than the baseline hazard rates.*

To test this hypothesis, a Cox-regression will be run using time as the independent variable, event as the dependent variable, and the days since last using, number of previous treatments for alcohol, number of treatments for drugs, and the ASI alcohol, ASI drug, and ASI psychiatric composite scores, will be entered into the equation individually. The resulting hazard function and survival curves are compared against the baseline hazard function and survival curves. The null hypothesis is that the covariates introduce no significant differences in hazard and survival.

Hypothesis III: *Variables related to employment – ASI employment composite scores, days employed in the last 30 days, and income earned in the past 30 days upon entry into OH – will be significant predictors of hazard and relapse occurrence to a statistically significant degree. Specifically, lower ASI employment score [unlike the previous ASI variables, lower scores on this measure indicates more severe problems with employment], lower initial income upon entry into OH, and fewer days employed, will predict a significantly higher hazard function and more relapse events.*

To test this hypothesis, a Cox-regression will be run using time as the independent variable, event as the dependent variable, and the ASI employment score, income upon entry into OH, days employed, will predict a significantly higher hazard function and more relapse events.

The resulting hazard function and survival curves are compared against the baseline hazard function and survival curves. The null hypothesis is that the covariates introduce no significant differences in hazard and survival.

Hypothesis IV: *Variables related to self-efficacy – scores on the Alcohol Abstinence Self-Efficacy (AASE) and Drug Abstinence Self-Efficacy (DASE) scales - can predict relapse occurrence and time-to-relapse in an OH to a statistically significant degree. Specifically, participants whose self-efficacy decreases over time will relapse more and experience shorter time-to-relapse rates than OH peers with stable or increasing alcohol and/or drug abstinence self-efficacy.*

To test this hypothesis, a Cox-regression using time-varying covariates will be run using time as the independent variable, relapse events as the dependent variable, and the AASE and DASE scores entered into the model at each discrete time interval as composites. As the AASE and DASE scores were gathered at baseline and at each wave, the analysis will be performed on a person-period data set constructed specifically to enable Cox proportional hazards regression using time-varying covariates. The resulting hazard function and survival curves are compared for each interval against the baseline hazard function and survival curves. The null hypothesis is that the covariates introduce no significant differences in hazard and survival.

Method

Research Participants

The data used for this study are from a study funded by the National Institute on Drug Abuse (NIDA) conducted in 2000-2003, referred hereafter as the NIDA Study. The NIDA Study consisted of 897 men and women participants living in 170 OHs from a U.S. national sample across five regions: Pacific Northwest (Washington and Oregon), Mid-Atlantic (Pennsylvania and New Jersey), South East Atlantic (North Carolina), and Southwest (Texas). Most participants (n=797) were recruited via an announcement providing contact information in the "Oxford Grape," a monthly newsletter published and distributed by Oxford House World Services, Inc. An additional 100 OH residents were recruited at an OH World Convention by DePaul staff. After completing the baseline surveys, participants received a $15 payment. The study contained four waves of assessment, with data collected in 4-month intervals. All other assessment waves included surveys administered either in person, by mail, or over the telephone. Participants were given $15 payment at each wave.

The baseline sample consisted of 604 male and 293 female residents. The ethnicity consisted of Caucasian 58.4%; African American 34.0%; Hispanic 3.5%; and Other 4%. Regarding marital status, 49% were single/never married, 46.2% were divorced, widowed or separated, and 4.8% were married. At baseline, 69.3% of the participants were employed full-time and 13.9% were employed part-time, 11.6% reported being unemployed, and 3.8% were retired or disabled. The average age of male participants was 39.4, while the average age for female participants was 36.5 years. Men had been in alcohol and drug or alcohol treatment and average of 3.0 and 2.9 times respectively, while women had been in alcohol and drug treatment for 2.3 and 2.8 times. At baseline, an equal number of men and women, approximately 30.3% of the entire sample, were on probation or parole. The average level of education for the sample was 149.44 months, or 12.45 years.

All participants recruited for the study were already OH residents; the average length of OH residency was 10.8 months. At Wave 1 (baseline) in the NIDA study, participants had lived

in Oxford Houses ranging from a few days to over 10 years (Jason et al., 2007a). Because of the range of time in OH varies, the participant data used for this study were a sub-set of the 897 participants in the NIDA Study. The selection of participants was driven by the need to eliminate what is called left censoring in survival analysis. (A full explanation of the problems of left censoring appear in the Statistical Analysis section below.) Briefly, left censoring occurs when participants are exposed to a treatment condition before the study begins, but the impact of the treatment exposure on the data of interest collected during Waves 1 through 4 is unknown. For participants living in OH for many months or years, it can not be determined what an effect of living in OH during the study has on the data of interest or of the relapse rates for these long-term OH residents.

Therefore, the researcher must make a choice based on certain assumptions on how the account for left-censored data. The most common technique to deal with left-censored data in longitudinal social science research, particularly in large community-based studies, is to set aside those cases in which long-term exposure to the experimental condition occurred before the study began (Iceland, 1997; Prinja, Gupta, & Verma, 2010; Stevens, 1999). As such, for analyses in this study, residents were selected who had entered into an OH within 60 days of the beginning of the NIDA study. This resulted in 268 cases from the original 897 at Wave 1 with 162 men and 106 women in the data set. This technique was the starting point for participant selection for the present study.

Measures

See Appendix A for a scanned copy of the measures used in the original NIDA study, a subset of which are used in this study. As stated earlier, the archival data used for this study are a sub-set of the data from the 897 participants in the NIDA Study. The selection of measures used for the sub-set was driven by the requirements of discrete-time survival analysis techniques using time-variant data (as opposed to time-invariant data, such as demographic data). As such, only those data that were gathered at all four waves were used in this study. These were data from the Addiction Severity Index-Lite (ASI-Lite: McLellan et al., 1992), the Alcohol Abstinence Self-

Efficacy scale (AASE: DiClemente et al., 1994) and a slightly modified version with 20 items to measure Drug Abstinence Self-Efficacy scale (DASE). The measure for the triggering event is taken at each wave from Miller and Del Boca's (1994) Form 90 Timeline Follow-back.

Addiction Severity. The *Addiction Severity Index-Lite* (ASI-Lite: McLellan et al., 1992) assesses problem areas commonly related to AOD problems. Separate sections gather problem information at baseline grouped into the following categories: Drug/Alcohol Use, Employment/Support Status, Family/Social Relationships, Legal Status (including illegal activity), Medical Status, and Psychiatric Status. (Note that the ASI asks for data on the participant's psychiatric history, rather than a psychiatric "status" or categorization.) This study used some of the composite scores created from these categories. These composite scores were created from the items in interrelated sub-scales within each problem area. These scores were standardized and summed to produce a numerical estimate of a participant's status in each problem area. Each problem area score ranges from 0 (no problems) to 1.00 (most severe problems) with the exception of the employment composite score, in which 0 (no employment resources or income) to 1.00 (most employment resources or income). As such, the employment composite is reverse scored for consistency with the other problem area composites.

Specifically, these items are taken from the ASI to test the hypotheses: socio-demographic data (age, marital status, education); alcohol problem severity composite score and number of alcohol treatments; drug problem severity composite score and number of drug treatments; employment composite scores, days employed in the last 30 days, and income from employment in the last 30 days; and psychiatric problem severity composite scores. In addition, the Medical Status composite scores, the Legal Status composite scores, and Family/Social Relationships composite scores will be reported as part of the demographic information. In each area, questions measure the number, extent, and duration of problem symptoms in the person's lifetime and in the past 30 days. The entire scale was administered at baseline, and information related to employment was gathered at the final, fourth follow-up assessment.

Alcohol and Drug Abstinence Self-efficacy. At baseline and at each of the three follow-up waves, all participants were administered the 20-item *Alcohol Abstinence Self-Efficacy* scale (AASE: DiClemente et al., 1994) and the *Drug Abstinence Self-Efficacy* scale (DASE). The AASE is a self-report measure derived from Bandura's (1986) cognitive-behavioral self-efficacy theory and based on past studies of high-risk situations for relapse (DiClemente, Fairhurst, & Piotrowski, 1995). The AASE is a measure that asked respondents to imagine 20 situations and to indicate how confident they were that they would not drink alcohol in each situation. Participants rated their level of confidence to not drink alcohol on a 5-point Likert scale (1=not at all confident; 5=extremely confident). The DASE is a slightly modified version of the AASE in which the words "drink alcohol" were replaced by the words "use drugs." The AASE and DASE represent time-varying measure that were used in the survival analyses for each wave. Both the AASE and the DASE displayed excellent alphas (.98 to .99) across all waves of the NIDA study.

Relapse Measure. Miller and Del Boca's (1994) *Form 90 Timeline Follow-back* was administered at baseline and at each of the subsequent follow-up waves four months apart. The Form 90 used in the NIDA study was a modified version which measured general health care utilization, residential history, and past 90-day alcohol and drug use. The Form 90 has good reliability for all key summary measures of alcohol consumption and psychosocial functioning and moderate reliability for most frequently used illicit drugs. Consistency of self-reported drinking has not been found to suffer across test–retest interviews (Tonigan, Toscova, & Miller, 1995). Even though the intervals in the NIDA study were 4 months, the instrument was used to capture alcohol and drug usage during the last 90 days of the 4-month period. If the participant answered positively to any use of drugs or alcohol, they would be considered a triggering event for the survival analysis.

Procedure

The data for the NIDA study were gathered during a 12-month longitudinal study with data gathered at baseline and at three subsequent waves 4, 8, and 12 months. To avoid confusion, these time points are referred to as Waves 1, 2, 3, and 4. Reliability of participants' self-reports

of alcohol and/or drug use were checked by contacting a random sample of Important Persons taking from the Important Persons Inventory.

Statistical Analyses

Past OH studies examined *predictors*, such as social support, or self-efficacy, which are measured at baseline and in periodic waves several months apart. The basic hypotheses are, longer periods in an OH affect predictors that have a statistically significant effect on an outcome variable. In the NIDA study, one of the outcome measures was cumulative abstinence with those who stayed in an OH 6 months or more (Jason et al., 2007a).

The research questions of this study emerge from a slightly different perspective. First, this study focuses on *event occurrence* – specifically, relapse, which is operationalized as a binary construct of any AOD during a study. Second, this study examined the prevalence and distribution of *when* a relapse occurred. Third, this study examined the incidence (the risk of it happening) of relapse and how certain hypothesized factors affect risk over time. In order to answer the questions, "does the setting promote long-term AOD remissions?" and "for whom does the setting benefit most or least?", this study examined the characteristics of all the individuals in the setting. This includes individuals who remained in the setting, individual who relapsed back into AOD problems, or those who dropped out of the setting.

Survival analysis techniques. Discrete-time survival analyses (SA) are a useful set of statistical techniques that can answer questions involving time-to-event occurrence, and provides the most robust models for analyzing the length of time for an event to occur (Singer & Willett, 2003). An event occurrence is any event that can be clearly delineated and mutually exclusive: smoking vs. non-smoking; pregnant vs. non-pregnant; death vs. living. As the name implies, the origins of SA are from the medical sciences and used to measure whether a particular treatment regime prolonged a person's life over another treatment or no treatment at all. All SA studies require data that have a measurable target event, a clearly delineated starting point when no one has experienced the event, a clearly delineated starting point when participants are exposed to the

treatment(s), and meaningful, often discrete time intervals in which the target event was recorded (Singer & Willett, 2003).

SA provides two important statistics: a *survival function* and a *hazard function.* Singer and Willett (2003) employ the analogy of *prevalence* for the survival function (the probability of cases surviving in a given population at a given time) and *incidence* for the hazard function (the frequency of occurrence in a given population at a given time). As a probability, the survival metric ranges from 100% surviving to 0% surviving and only decreases over time, or it remains flat. The survival metric any discrete point in the study indicated the probability of an individual surviving beyond time *t*.

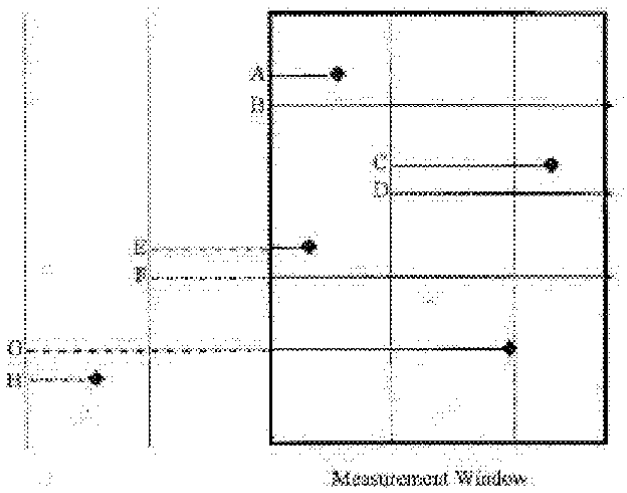
The second SA metric is the *hazard function*, which is the pooled risk for experiencing the event during that time period. Hazard can increase or decrease over time, or may have patterns over the course of the study that reflects the changes in risk for relapse at any particular time. The hazard probability also changes at each wave because of dropout and relapse. Dropouts and relapses removes participants from the risk pool, increasing the likelihood the remaining participants will experience the event.

In addition to providing techniques to measure time-to-event occurrence, SA addresses a statistical problem called *censoring:* a common problem in longitudinal studies. Data censoring occurs when an event or variable of interest becomes unknowable because the study ends before the event occurs, a participant drops out of the study, or when variables that likely affect the outcome(s) occurred before the study began. Like many longitudinal studies, data for the NIDA study was gathered during a finite and arbitrary window of time: baseline (Wave 1), and at three-month intervals over 12 months for four waves. The event of interest is AOD relapse, and other factors that were hypothesized to influence the time-to-occurrence were measured over the course of the year. However, some participants did not relapse during the study period. It is possible that a participant relapsed just days or weeks after leaving the study. In addition, participants may have dropped out before the end of the study. In SA terms, these data are *right*

censored; that is, it is not possible know anything about these participants' relapse experiences (if any) after leaving the study.

Not everyone in the NIDA study entered an OH at the same time; some had been living in an OH for as long as 9 years prior to the beginning of the study (Aase, Jason, Olson, Majer, Ferrari, Davis, & Virtue, 2009). This is called *left censoring*, because we do not know exactly how the variables measured during the study were "in-play" before the study began. Left censoring is more serious than right censoring because it skews the survival probabilities and risk factors from the very beginning. For example, we do not know specifically what effect the effect of time living in an OH had for left-censored individuals.

Figure 1. Left censored (E, F, G, & H) and right censored (B, D, and F) data.



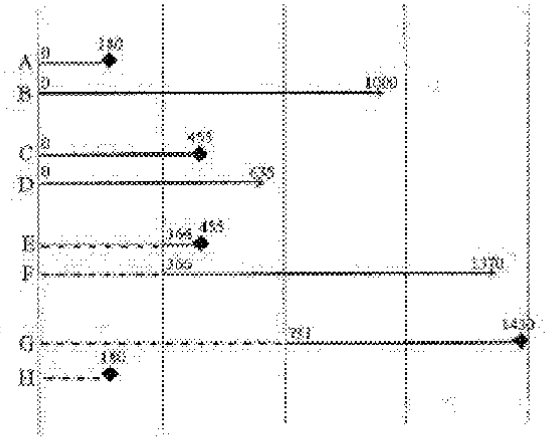
Various statistical techniques employ differing methods to account for censored data. Even so, even relatively straightforward questions become difficult to answer because of censored data. For example, with 895 participants at the start of the NIDA study, Jason et al. (2007) very reasonably calculated the average length of sobriety for the participants in the NIDA study using the 607 participants remaining at the end of the study. However, this number ignores the data from the 290 people who dropped out of the study. Estimating the status of the 290 participants (non-sober/sober) at the end of the study by assigning a relapse/non-relapse status to them will not increase the accuracy of the average length of sobriety statistic. In addition, since

the goal of the study was to examine the effects of living in an OH during the 12 months of the study, it is unclear how meaningful the statistic "average length of sobriety" is in the context of this study.

Survival analysis uses all data of interest in every calculation during every discrete time period. Survival analysis can overcome the statistical problem of censoring because it includes every piece of data for each participant for each discrete time interval when constructing the survival and hazard functions. When a person drops out or relapses, SA adjusts the overall risk curve. Thus, SA uses *all* the data available to get a more accurate reading of what actually happened in the study compared to other statistical methods that ignore censored data.

One way to minimize the problem of left-censored data is to analyze a selected subset of the participants more recently exposed to the OH treatment. In their efforts to understand the relationship of living in an OH on aggressive and criminal behavior, Aase et al. (2009) analyzed data from only participants who lived in an OH 30 days or less at the beginning of the NIDA study. This resulted in an *N* of 165 at baseline, of which 88 participants remained at the end of the study. It is not known what proportion of those 165 participants relapsed. Similarly, to minimize the problem of left-censored data, the current study only focused on people who moved into an OH within a window 60 days before the start of the study resulting in 298 participants. Using a 60-day window before and after the beginning of the study allows for a substantial increase of data while avoiding exposing or depriving participants 1/3 or less of the six-month dosage found to be effective in prior OH studies (Groh et al., 2007; Jason et al., 2007a).

Figure 2. Examples of non-censored data



Specific attributes of the NIDA data used in this study make it appropriate to employ survival analysis techniques. These are: a target event (AOD relapse), an initial starting point when no one in the study experienced relapse (when participants entered the study), a starting point when everyone is exposed to the treatment (entry into the OH system), and meaningful, discrete time intervals in which the target event occurrence data was recorded (interviews at waves three months apart).

This study used two methods of survival analyses to test the hypotheses. First, this study used the life table method that constructed the overall survival and hazard curves of the sample based solely on time, event occurrence, and dropouts. Next, the study constructed survival and hazard functions by entering hypothesized time-invariant variables into the Cox proportional hazard regression models that should affect the baseline survival and hazard curves. If the hypothesized survival/hazard function differs significantly from the baseline curves, the null hypothesis is rejected, meaning that factor (or group of factors) has a significant impact on survival and/or hazard.

The second method is to perform specific Cox proportional hazard regression models for time dependent, time-varying data (Singer & Willett, 2003). The time dependent variables in this

study are the Alcohol and Drug Abstinence Self-efficacy scales (AASE and DASE, respectively) administered at baseline and across all remaining waves of the study. The AASE and DASE are used as predictor variables that may change across time. Cox proportional hazards regression models estimates the rate in which participants relapse, and provides hazard ratios that reflect the relative risks of relapse at any point in time during the study. If the hypothesized model using time-dependent covariates affects the hazard function to a significant degree over the baseline, the model is considered to be a better fit to explain hazard than the baseline hazard model.

IRB Approval

Upon the approval of this study by the Dissertation Committee, the project proposal description was sent to DePaul's IRB for approval. Permission was granted on the condition that all data that could be traceable and identifiable to individual participants be removed. On this assurance, the author received a non-renewable exemption letter from DePaul's IRB in November of 2013 (see Appendix B).

Data Preparation

First, those participants living in an OH for 60 days or less were selected from the original NIDA master data set, resulting in 268 participants. Then, all potentially identifiable data were removed from the data file leaving only the variables necessary for basic demographical reporting and for analysis of the four hypotheses.

Several modifications to the resulting data set were required to perform survival analysis. First, a binary event variable was created to indicate event occurrence/relapse (set as "1") or censored (set as "0"). Event occurrence was set to "1" if a participant self-reported on the Form 90 using any amount of either drugs or alcohol during a wave. Recall that "censored" means only that it is unknown whether the person experienced relapse. Once modified to indicate event occurrence, this data set was used for survival analysis using time-invariant covariates.

Thus, this data set was arranged as a person-oriented data set, to use SA terminology (Singer & Willett, 1991). For this study, the person-oriented data set has 268 rows of data

representing one person with multiple columns representing each participant's variables across time, which were grouped and sorted by waves.

Further modifications to the person-oriented data were required to allow survival analysis of event occurrence using time-varying covariates. Time-varying survival analysis requires data to be arranged such that each row of data represents each participants' data for each period they are present in the study. Each row contains the participant identifier, and the time the time-varying data for that time period, and their event status. Thus, in this study with four waves of data, a participant who remained in the study and did not experience relapse would have four records: one row/record for each wave, with time-varying covariates differing at each record. Likewise, a participant who entered the study and relapsed after the first wave would have two records: one for the data gathered at the first wave, and a second row indicating relapse. Participants who dropped out of the study would also have one record for each wave they had participated, but the event variable set to "0" as censored.

This kind of arrangement resulted in a "person-period" data set (Singer & Willett, 1991) which resulted in 729 records of time-varying data.

Results and Analyses

These data were analyzed using SPSS v21 and SAS v9.2 statistical software packages using a Windows 7 computer.

Table 1 show the demographic information of the 268 participants, means of variables, and comparisons based on gender. There were no significant differences between groups for education, ethnicity, or marital status, or age. The two groups differed on three ASI-derived measures: employment income in the past 30 days with men having significantly higher income, $F(1,257) = 12,24$, $p = .001$. This relationship was moderate as assessed by $\eta^2 = .06$. Men also had higher number of previous treatments for alcohol, $F(1, 258) = 7.31$, $p = .007$, but not for drugs, $F(1, 262) = .436$, $p = .510$. This relationship was relatively weak as assessed by $\eta^2 = .03$. On one ASI composite measure, women indicated more severe problems with family and social status, $F(1, 229) = 14.33$, $p < .001$. This relationship was moderate as assessed by $\eta^2 = .05$.

A set of analyses was performed to check the survival analysis covariates accuracy of input, adequacy of sample size, missing data, and reasonable distributions of the data as recommended by Tabachnick and Fidell (2007). Descriptive statistics indicated that most variables were normally distributed without significant outliers.

Table 2 shows the rate of participants not using substances, relapsed, or dropped out of the study at each wave. Comparisons of all the demographic data and IVs between the No Use, Relapsed, and Dropped groups were not significant. As such, it was surmised that no substantial or systematic differences were present between the participants who dropped out versus participants who remained in the study.

Table 1

Participant Socio-demographic and ASI Variable Comparisons at Baseline

	Sample (N=268)	Male (n=161; 60.1%)	Female (n=107; 39.9%)		
	M (SD)	*M (SD)*	*M (SD)*	*p*	η^2
Age	35.17 (8.94)	36.01 (9.00)	33.91 (8.75)	.06	
Education (months)	149.44 (26.57)	150.96 (24.54)	147.14 (29.34)		
Employment					
Days paid work last 30 days	11.67 (11.40)	12.11 (11.12)	10.96 (11.86)		
Employment income last 30 days	$479.45 ($754.43)	$608.86 ($874.73)	$280.26 ($453.85)	**	.05
Length of sobriety (days)					
Alcohol	298.03 (661.67)	345.90 (741.36)	225.99 (514.24)		
Drugs	345.31 (951.22)	406.42 (1105.57)	253.35 (648.04)		
Number of previous treatments (lifetime)					
Alcohol	2.98 (4.59)	3.59 (5.49)	2.03 (2.36)	**	.03
Drugs	2.91 (3.37)	3.02 (3.89)	2.74 (2.42)		
Prior criminal charges	4.90 (7.20)	4.99 (7.43)	4.75 (6.86)		
ASI Composite Scores (.00-1.00; lower is better)					
Medical	.25 (.26)	.24 (.28)	.27 (.24)		
Alcohol	.16 (.11)	.16 (.11)	.15 (.11)		
Drug	.08 (.05)	.07 (.04)	.08 (.05)		
Legal	.14 (19)	.13 (.18)	.16 (.19)		
Family/Social	.30 (.16)	.27 (.16)	.34 (.16)	**	.06
Psychiatric	.19 (.23)	.18 (.22)	.22 (.23)		
Employment (reverse scored)	.61 (.30)	.62 (.30)	.61 (.31)		
	% (n)	*% (n)*	*% (n)*	*p*	
Race/Ethnicity					
White/Caucasian	66.4 (178)	68.3 (110)	63.6 (68)		
Black/African American	26.1 (70)	23.0 (37)	30.8 (33)		
Hispanic/Latino	4.9 (13)	6.2 (10)	2.8 (3)		
Other	2.6 (7)	2.5 (4)	2.8 (3)		
Marital status					
Never married	49.6 (133)	49.7 (80)	49.5 (53)		
Divorced//widowed	29.4 (78)	31.7 (51)	25.2 (27)		
Separated	16.0 (43)	13.0 (21)	20.6 (22)		
Married	4.1 (11)	3.7 (6)	4.7 (5)		

* $p \leq 0.05$
** $p \leq 0.01$

Table 2

Relapses, Drop Rates, and Mean Survival Times for 268 Participants and by Gender

	No Use/Relapsed/Dropped		
Time period	Sample (N=268)	Male (n=161)	Female (n=107)
Wave 2	170/31/67	97/17/47	73/14/20
Wave 3	128/21/19	77/11/9	51/10/10
Wave 4	87/23/16	52/14/10	35/9/6
Total	87/75/102		
	Mean Survival Time (in Waves)		
	Sample (95% CI)	Male (95% CI)	Female (95% CI)
	2.57 (2.47-2.68)	2.59 (2.46-2.73)	2.54 (2.38-2.70)

A number of survival analysis procedures were performed to analyze the data before testing the four hypotheses. First, a life-table procedure was constructed to give the overall survival probabilities and hazard rates for the sample. Constructing a life table is a descriptive procedure for examining the distribution of time-to-event variables. To construct a life table, time is the independent variable and the event occurrence is the dependent variable. Wave 1 is the baseline at which no time has passed; no participant is yet exposed to the unique hazard living in the OH condition, and survival is 1.00 at the start of the study. A useful interpretive heuristic is to think of Wave 2 as the discrete time block between Wave 1 and 2, Wave 3 as the discrete time block between Waves 2 and 3, and Wave 4 as the discrete time block between Wave 3 and 4 (the end of the study).

Table 3 shows the life table for this study at waves 2 through 4 and overall with the hazard rates and survival probabilities calculated. Hazard represents the risk of relapse for the sample exposed to the risk at that wave. The time of greatest hazard is the interval between Waves 1 and 2, with a hazard rate of 18% and 31 relapses during this interval. Sixteen percent hazard between waves 2 and 3 with 21 participants relapsing. The number of relapses from waves 3 to 4 (the end of the study) were 23, indicating a hazard of 41%. However, as the risk pool was the smallest during this interval (87 participants), this statistic and the resulting hazard rate of 41% is misleading, and most survival analyses in the literature omit this statistic.

Table 3

Life Table Showing Hazard Probabilities and Survival Functions

Interval	# Entering	# Withdrawing	# Exposed to Risk	# Relapses	*Cumulative Surviving*	*Hazard Rate*
Wave 1	268	0	268	0	1.00	.00
Wave 2	201	67	234	31	.85	.18
Wave 3	149	21	190	21	.71	.16
Wave 4	112	16	141	23	.47	-

Hypothesis I

For hypotheses I, a Cox proportional hazards regression survival analysis was performed to assess the effects of the continuous variables age and level of education, and the categorical predictor marital status, on relapse. This model showed no significant differences compared to the baseline hazard, Wald χ^2 (5) = 4.91, p = .428. Table 4 shows the individual component slopes, standard errors, probability estimates, hazard ration, and 95% confidence intervals for each of these variables.

Cox proportional hazards regressions were performed for each of the individual IVs to determine their effects on the hazard rate. Age did not have a significant effect on hazard compared to the baseline, B = -.001, Wald χ^2 (1) = .011, p = .916, Exp(B) = .999. The effect of marital status, set to four categories, was also not significant, Wald χ^2 (3) = 4.03, p=.258. Of these categories, only being married approached significance, B = -.477, Wald χ^2 (1) = 3.41, p = .065, Exp(B) = .621. As being married approached significance, these numbers suggest that being married decreased the hazard (as indicated by the negative value of the slope) rate by 62.1%. Lastly, level of education was also not a significant predictor of hazard, B=.002, Wald χ^2 (1) = .263, p=.608, Exp(B)=1.002.

In sum, Hypothesis I was not supported. Demographic variables shown in previous studies to have an effect on relapse rates did not contribute significantly to this model.

Table 4

Hypothesis I – Demographic Covariate Analyses using Cox Proportional Hazards Regression

Covariate	B	SE	Wald χ^2	*p*	Hazard Ratio (95% CI)
Age	-.001	.013	.011	.92	.99 (.97-1.03)
Marital Status					
Never Married (*n*=133)	-	-	4.18	.243	-
Married (*n*=11)	-.477	.258	3.41	.065	.621 (.37-1.03)
Separated (*n*=43)	.250	.609	.168	.682	1.28 (.39-4.24)
Divorced/Widowed (*n*=78)	-.283	.358	.626	.43	.75 (.37-1.52)
Level of Education	.002	.004	.263	.61	1.00 (.99-1.01)

Hypothesis II

For Hypothesis II, a Cox proportional hazards regression survival analysis was performed to assess the effects of SUD and SUD-related problem severity on the risk of relapse. Six variables were entered into the model as a composite and compared against the baseline: number of previous treatments for alcohol, number of treatments for drugs, and the ASI alcohol and ASI drug composite scores, the ASI psychiatric problems composite score, and days since last substance use. This model indicated a significant difference compared to the baseline hazard, Wald χ^2 (6) = 19.76, p = .003. Table 5 shows the individual component slopes, standard errors, probability estimates, hazard ration, and 95% confidence intervals.

Cox proportional hazards regressions were performed for each of the individual IVs to determine their effects on the hazard rate. For the number of previous treatments for alcohol was significant, B = .065, Wald χ^2 (1) = 4.50, p = .034, Exp(B) = 1.067, meaning each additional alcohol treatment episode increased the hazard rate by 6.7%. The effects of number of previous treatments for drugs was also significant, B = .081, Wald χ^2 (1) = 8.40, p = .004, Exp(B) = 1.084, meaning each additional drug treatment episode increased the hazard rate by 8.4%. ASI alcohol composite scores were also significant, B = 2.11, Wald χ^2 (1) = 4.54, p = .033, Exp(B) = 8.23. As the all ASI composite scores range from 0 to 1, it is meaningful to divide the hazard rate by 10 to reflect a .10 change in ASI scores. Thus, for each .10 increase in the ASI alcohol composite increases the hazard rate by 82%. Significant results were also found for the ASI psychiatric

problems, B = 1.03, Wald χ^2 (1) = 4.28, p = .039, Exp(B)= 2.80, meaning that for each .10 increase in the ASI psychiatric composite increased the hazard by 28%.

Days since last substance used was not significant, B = .-001, Wald χ^2 (1) = 3.08, p = .079, Exp(B)=.999. Although not significant, it is worth noting that a negative slope indicates for one unit increase in the IV has the expected directional effect of reducing the hazard rate. In this case, each day added since the last time substances were used *reduced* (though not significantly) the hazard rate. Lastly, the ASI drug severity composite scores was not significant, B = 3.31, Wald χ^2 (1) = 1.29, p = .256, Exp(B) = 27.42.

Correlation coefficients were computed between the variables indicating the number of previous treatments for alcohol and drugs. There was a significant and positive correlation between the two variables, r=.40, n=257, p<.001.

Table 5

Hypothesis II - Problem Severity Covariate Analyses of Individual Variables using Cox Proportional Hazards Regression

Covariate	B	SE	Wald χ^2	p	Hazard Ratio (95% CI)
# Previous Treatments for Alcohol	.065	.031	4.50*	.034	1.07 (1.00-1.13)
# Previous Treatments for Drugs	.081	.028	8.40**	.004	1.08 (1.03-1.15)
ASI Alcohol Composite	2.11	.99	4.58*	.033	8.23 (1.18-57.24)
ASI Drug Composite	3.31	2.91	1.29	.256	27.42 (.091-8306.06)
ASI Psychiatric Problems Composite	1.03	.50	4.28*	.039	2.80 (1.06-7.42)
Days since last Used	-.001	.001	3.08	.079	.99 (.998-1.00)

* $p \leq 0.05$
** $p \leq 0.01$

In sum, Hypothesis II was supported. The variables that indicated more severe SUD and psychiatric problems significantly predicted higher hazard to relapse. It was found that the components contributing most significantly to hazard compared to the baseline were ASI alcohol severity, ASI psychiatric severity, and the number of previous drug and alcohol treatments. ASI drug severity and days since last used substances did not contribute significantly to the model.

Hypothesis III

For Hypothesis III, a Cox proportional hazards regression survival analysis was performed to assess the effects of employment on the risk of relapse. Three variables were entered into the model as a composite and compared against the baseline: the number of days paid for work in past 30 days, the amount of money received (past 30 days) from employment, and the ASI employment composite index. The ASI employment raw composite is reverse-scored; usually, higher ASI scores indicated greater problem severity, whereas a higher raw ASI score for employment indicates better outcomes.

The overall model showed no significant differences compared to the baseline hazard, Wald $\chi^2(3) = 1.82$, $p = .612$. Table 5 shows the individual component slopes, standard errors, probability estimates, hazard ration, and 95% confidence intervals for each of these variables.

Cox proportional hazards regressions were performed for each of the individual IVs to determine their effects on the hazard rate, if any. ASI employment composites did not have a significant effect on hazard compared to the baseline, B = -.385, Wald $\chi^2(1) = 1.05$, $p = .305$, Exp(B) = .680. The effect of days of paid work in the last 30 days was also not significant, Wald $\chi^2(1) = .010$, $p = .349$. Lastly, income from work in the last 30 days was also not a significant predictor of hazard, B = .000, Wald $\chi^2(1) = .002$, $p = .960$, Exp(B) = 1.000.

Table 6

Hypothesis III - Covariate Analyses of Employment Variables using Cox Proportional Hazards Regression

Covariate	B	SE	Wald χ^2	p	Hazard Ratio (95% CI)
ASI Employment Composite	-.385	.375	1.05	.305	.68 (.326-1.42)
Days employed last 30 days	.010	.010	.877	.349	1.01 (.99-1.03)
Income from employment last 30 days	.000	.000	.002	.960	1.00 (1.00-1.00)

In sum, Hypothesis III was not supported and no variables evidenced a significant effect on baseline hazard. Employment variables shown in previous studies have an effect on relapse rates did not contribute to this model.

Hypothesis IV

For Hypothesis IV, a Cox proportional hazards regression using time-varying covariates was performed to assess the effects of alcohol and drug abstinence self-efficacy (AASE and DASE, respectively) on the risk of relapse. Two time-varying variables were entered into the model for each participant at each time interval they were present in the study using a person-period data set. The AASE and DASE composites were compared against the baseline hazard for each wave. This model indicated a significant difference compared to the baseline hazard, Wald $\chi^2(2) = 27.75$, $p<.001$. Table 6 shows the individual component slopes, standard errors, probability estimates, hazard ration, and 95% confidence intervals for the AASE and the DASE.

Cox proportional hazards regressions of time-varying covariates were performed for the AASE and DASE to determine their individual effects on the hazard rate. The effect of alcohol self-efficacy (AASE) was significant, B = -.012, Wald $\chi^2(1) = 9.37$, $p = .002$, Exp(B)=.098, meaning each additional unit in alcohol self-efficacy (which ranges from 0 to 100) decreased the hazard rate by 1.2%. However, did DASE not have a significant effect on hazard compared to the baseline, B = .001, Wald $\chi^2(1) = .120$, $p = .729$, Exp(B) = 1.001.

In sum, Hypothesis IV was supported in that time-varying self-efficacy predictors that changed over the course of the four waves had a significant effect on hazard rates. However, only changes in alcohol self-efficacy made a significant contribution to the model. Specifically, a one-unit increase of alcohol abstinence self-efficacy reduced hazard by 1.2%. Drug abstinence self-efficacy did not contribute significantly to the model.

Table 7

Hypothesis IV – Analysis of Time-varying Alcohol and Drug Abstinence Self-Efficacy using Cox Proportional Hazards Regression

Covariate	B	SE	Wald χ^2	*p*	Hazard Ratio (95% CI)
Alcohol Abstinence Self-Efficacy	-.012	.004	9.37**	.002	.988 (.980-.996)
Drug Abstinence Self-Efficacy	.001	.004	.120	.729	1.001 (.994-1.009)

* $p \leq 0.05$
** $p \leq 0.01$

Supplemental Analyses

Supplemental analyses were computed to compare non-hypothesized group differences based on gender and ethnicity using non-proportional Kaplan-Meier survival analysis techniques. The Kaplan-Meier methods are used because there are no hypothesized models of group difference to test against a null hypothesis that there are no differences between the groups. The Kaplan-Meier method is a non-parametric technique similar in concept to a life table in that it reports the frequency of relapse and censoring (dropouts) for each discrete time. The life table is divided into each of the waves; the number of relapses, as well as the number of cases that were censored, are all calculated for each wave. From these figures, the proportions of relapses and the cumulative proportion or surviving participants was calculated. This method also creates a life table that simply reports the survival rates for the groups at each time point. The resulting survival and hazard functions were then compared using a chi-square log-rank statistic for significant differences between the groups.

There were no significant differences between men and women on hazard. The mean survival for men was 2.60 waves, and for women 2.54 waves, the log-rank $\chi^2(1) = .249$, $p = .618$. Summary survival statistics are shown in Table 8.

Table 8

Supplemental Analyses – Gender Comparisons using Kaplan-Meier Method

Covariate	Mean Wave (95% CI)	SE	Wald χ^2	*p*
Gender (*n*)	2.57 (2.47-2.68)	.054	.249	.62
Male (*n*=161)	2.60 (2.46.- 2.73)	.070	-	-
Female (*n*=107)	2.54 (2.38 - 2.71)	.084	-	-

However, a Kaplan-Meier comparison based among ethnic groups revealed a log-rank Mantel-Cox χ^2 (3) = 8.21, p = .042 that indicated the hazard among the ethnic groups were not equal. Subsequent pairwise comparisons among the ethnic groups found that the Caucasian group had significantly higher hazard than the African American group, Wilcoxon-Gehan χ^2 (1) = 3.86, p = .049, and the Latino/Hispanic group, Wilcoxon-Gehan χ^2 (1) = 3.88, p = .049. No other pairwise group comparisons were significant.

Table 9

Life Table Summarizing Hazard Probabilities and Survival among Ethnicities

Ethnicity (*n*)	# Exposed to Risk	# Relapses	Proportion Surviving	Hazard Rate
White/Caucasian				
Wave 1	178	0	1.00	.00
Wave 2	132	25	.80	.22*
Wave 3	93	17	.81	.21*
Wave 4	66	15	.63	-
Black/African American				
Wave 1	70	0	1.00	.00
Wave 2	52	6	.88	.13*
Wave 3	42	3	.93	.08*
Wave 4	37	7	.68	-
Hispanic/Latino				
Wave 1	13	0	1.00	.00
Wave 2	12	0	1.00	.00*
Wave 3	10	1	.88	.13*
Wave 4	6	1	.71	-
Other Ethnicity				
Wave 1	7	0	1.00	.00
Wave 2	5	0	1.00	.00
Wave 3	4	0	1.00	.00
Wave 4	3	0	1.00	-

* $p \leq 0.05$

A final set of supplemental analyses were performed to check whether any non-hypothesized ASI composite variables reported on Table 1 had a significant effect on hazard. These variables include the ASI composites for Legal problems, number of previous criminal convictions, ASI composites for Family/Social problems, and the ASI Medical problems composite.

Cox proportional hazards regressions were performed to test each individual factor and their effects on the baseline hazard rate, if any. ASI legal composites did not have a significant effect on hazard compared to the baseline, B = .336, Wald χ^2 (1) = .264, p = .608, Exp(B) = 1.40.

Likewise, the effect of number of previous crime convictions was also not significant, B = -.021, Wald χ^2 (1) = 1.10, p = .294, Exp(B) = .979.

The ASI composite for Family/Social problems did not have a significant effect on hazard compared to the baseline, B = 1.12, Wald χ^2 (1) = 2.16, p = .142, Exp(B) = 3.05. Likewise, the effects of the ASI Medical composite scores was also not significant, B = .431, Wald χ^2 (1) = .893, p = .345, Exp(B) = 1.54.

Discussion

The goals of this study were to determine what factors had a significant impact on risk for relapse among residents living in OH over a period of one year. Survival analysis techniques were used to establish a baseline hazard and survival function, and to test four hypotheses predicting that covariates would significantly increase or reduce hazard rates. Three hypotheses predicted the impact of time-invariant factors, and one hypothesis tested time-varying abstinence self-efficacy across all four waves.

Baseline hazard functions indicated that baseline to Wave 2 had the highest hazard risk of 18% for the sample exposed to the risk. Hazard reduced slightly from Waves 2 to 3 to 16%. This finding supports previous OH and other treatment aftercare literature that found stays of six months or more aftercare environments promoted long-term recovery (Jason et al., 2007a; McKay, 2005). The hypotheses based on addiction severity were supported; the overall model was significant. Individually, the time-invariant factors at baseline that significantly increased hazard rates were higher levels of alcohol problems, higher levels of psychiatric co-morbidity, and the greater number of prior alcohol or drug treatment episodes. Individually, length of sobriety on entry into OH at the beginning of the study had no effect on hazard. As stated earlier, the effects of length of sobriety on relapse is inconclusive. This study essentially replicates the non-effect of length of sobriety found in Jin and colleagues' (1998) survival analysis of relapse of long-term abstinent alcoholics across 11 years.

The hypothesis predicting that time-varying alcohol and drug abstinence self-efficacy across the waves would significantly affect baseline hazard was supported. Among these factors, only the time-varying co-factor of increases in alcohol abstinence self-efficacy significantly reduced hazard rates; drug abstinence self-efficacy had no significant effects on hazard.

The hypotheses for demographic factors and employment were not supported both as an overall model and as individual factors. That is, age, marital status, level of education, ASI employment composite scores, days employed in the last 30 days, and employment income at baseline had no significant impact on baseline hazard. Being married appeared to be a potential

protective factor by marginally reducing hazard, although among this sample the variable being married approached but did not attain statistical significance, possibly because the number of married participants was small (only 4.1% of this sample).

Supplemental analyses found no differences in hazard between men and women. A significant reduction in hazard was found among African Americans compared to White and Latino/Hispanic participants, particularly in the early waves of the study. The finding that Caucasian residents of OH had significantly higher hazard than other ethnicities – African Americans in particular – supports Bishop et al.'s (1998) findings that African Americans tended to stay in OH longer than Whites, and perhaps benefited from longer stays as reflected in lower hazard rates.

These findings suggest a number of practical recommendations for OH residents and the aftercare industry as a whole. Specifically, newer OH residents with more psychiatric problems and prior alcohol and drug severity could benefit from targeted and more intense aftercare services. Senior OH residents often serve as teachers and mentors for newer residents (Viola, Ferrari, Davis, & Jason, 2009); given this study's findings, senior residents could justify encouraging newer residents to obtain additional services. This in turn could lead to longer stays in aftercare, which would otherwise shorten by obligatory eviction from OH triggered by a relapse (Oxford House Inc., 2004). Given this study's findings that prior long-term abstinence or length of sobriety are not clearly protective against relapse, this further supports the notion that extending care beyond treatment could be an effective strategy to prevent relapse and subsequent re-treatments (Marlatt & Donovan, 2005; McKay, 2011).

The findings that drug problem severity and drug abstinence self-efficacy levels have no impact on hazard compared to alcohol problem severity and alcohol abstinence self-efficacy was surprising. These findings suggest a possible lack of instrument sensitivity in measuring drug versus alcohol self-efficacy. As the situational questions in the DASE are identical to the AASE except that the word "drugs" is substituted for "alcohol," it is possible that conflating the situational triggers for using drugs and alcohol will be a misguided. Given the greater stigma of

drug use because of their current illegal status and the potential dangers of obtaining some drugs relative to alcohol, the alcohol situational triggers described in the AASE may be accurate, while the drug situational triggers are less so.

There are a paucity of studies differentiating self-efficacy based on substance of choice. El-Sheikh and Bashir found differences in self-efficacy scores in a study comparing 105 heroin users and 75 alcohol users (El-Sheikh & Bashir, 2004). However, El-Sheikh and colleagues used two different self-efficacy measures: the Inventory of Drug Taking Situations (IDTS) and the Situational Confidence Questionnaire (SCQ) (Annis & Graham, 1988; Annis & Martin, 1985b). The IDTS measures self-efficacy to resist both alcohol and drug use in high-risk situations; the SCQ measures non-specific substance coping in high-risk situations. El-Sheikh hypothesized there would be no differences between the alcohol and heroin groups on either measure. Neither of these hypotheses were supported; heroin users had higher IDTS scores than the alcohol users, and alcohol users had higher SCQ scores than the heroin group. Although not conclusive, this study supports El-Sheikh's findings of differing situational self-efficacy processes might be activated based on drug of choice. Again, this might be the result of differences in stigma, legality, availability, toxicity, and costs between alcohol and drugs. Regardless, there appears to be differences in measurement requirements between these two substances of choice.

This supposition is also supported by a comparison of self-efficacy measures based on drug of choice conducted by Sklar and colleagues (1999). Sklar et al. compared self-efficacy scores of 344 alcohol and 253 cocaine clients in treatment However, Sklar et al. used yet another instrument, the Drug Taking Confidence Questionnaire (DTCQ) (Annis & Martin, 1985a). Like the IDTS, the DTCQ asks participants to rate their situational ability to resist a using alcohol and variety of drugs. Sklar and colleagues found that the alcohol group had lower self-efficacy scores in interpersonal conflict situations, whereas the cocaine group had lower self-efficacy scores in temptation-related situations. This study argues that using the DTCQ to assess self-efficacy for all possible substances might be a more sensitive instrument than the AASE and modified DASE.

Also rare are scholarly articles on the differentiation of treatment of alcohol versus drug problems. If these treatment groups are different, then it is possible that self-efficacy measures among the groups will warrant closer examination too. Westerberg and colleagues conducted a cluster analysis to compare the characteristics of relapse rates of groups in treatment for alcohol versus drugs versus tobacco (Westerberg, Miller, Harris, & Tonigan, 1998). Their findings indicated that there exists a distinct clustering of abstinent, light-users, and non-abstinent alcohol use when considering alcohol users in isolation, while the clustering became much more numerous when considering drug users who drank alcohol but could abstain from drugs, but not tobacco. That is, Westerberg et al. suggested that relapse depended on the problem substance, and that studies that dichotomized any use of alcohol and drugs as a relapse were mistaken.

Further supporting the recommendation to not equate alcohol and drug recovery process, many mutual-help groups view persons who use alcohol as their primary substance of choice and their processes of recovery as different than persons who use drugs and their processes of recovery. Some early peer-run therapeutic communities viewed drug problems as being entirely different from alcohol problems; in fact, clients could earn "drinking privileges" for staying abstinent from drugs in some early therapeutic communities (Janzen, 2001; White, 2007). Even today, Alcoholics Anonymous distinguish drug recovery as "problems other than alcohol" and encourage people who want to recovery from drug use (but do not have alcohol problems) to seek the appropriate 12-step group or treatment center based on their substance of choice (AA World Services, 1958).

Future research should be conducted to analyze the survival rates and hazard risk of other samples of OH residents. Any OH data set that tracked participants across time and were able to record relapse event occurrence and event times are suitable for this type of analysis, such as the NIAAA data set (Jason et al., 2007b). The NIAAA data could allow researchers to compare the relapse and hazard rates of randomly assigned participants to OH and other aftercare modalities. Further, current studies comparing substance use and re-incarceration events could also benefit from survival analyses (Jason, Olson, & Harvey, submitted for review). However, these

participant pools are considerably smaller that the data set used here, and neither of these data are nationally representative samples of OH residents.

One of the characteristics of survival analysis is that it is a statistical method that appears inherently pessimistic; indeed, SA is also known as "failure analysis," particularly in the engineering field (Allison, 2010). The author is not pessimistic of AOD recovery in general and OH recovery aftercare in particular, and is attracted to community psychology and its principles because of their inherent optimism to create social change. Importantly, this study is not an explicit evaluation of the quality of care available in Oxford House, nor should the triggering event, "relapse," be viewed with any kind of criticism of the OH environment. Much research on substance abuse treatment focus on abstinence outcomes (Office of Applied Studies, 2008). Outcome studies are undeniably useful ways to measure program effectiveness in terms of abstinence rates. Likewise, evaluating the structures and methods employed by these programs and the demographics of the populations inhabiting them and their potential relationship to relapse are also valuable.

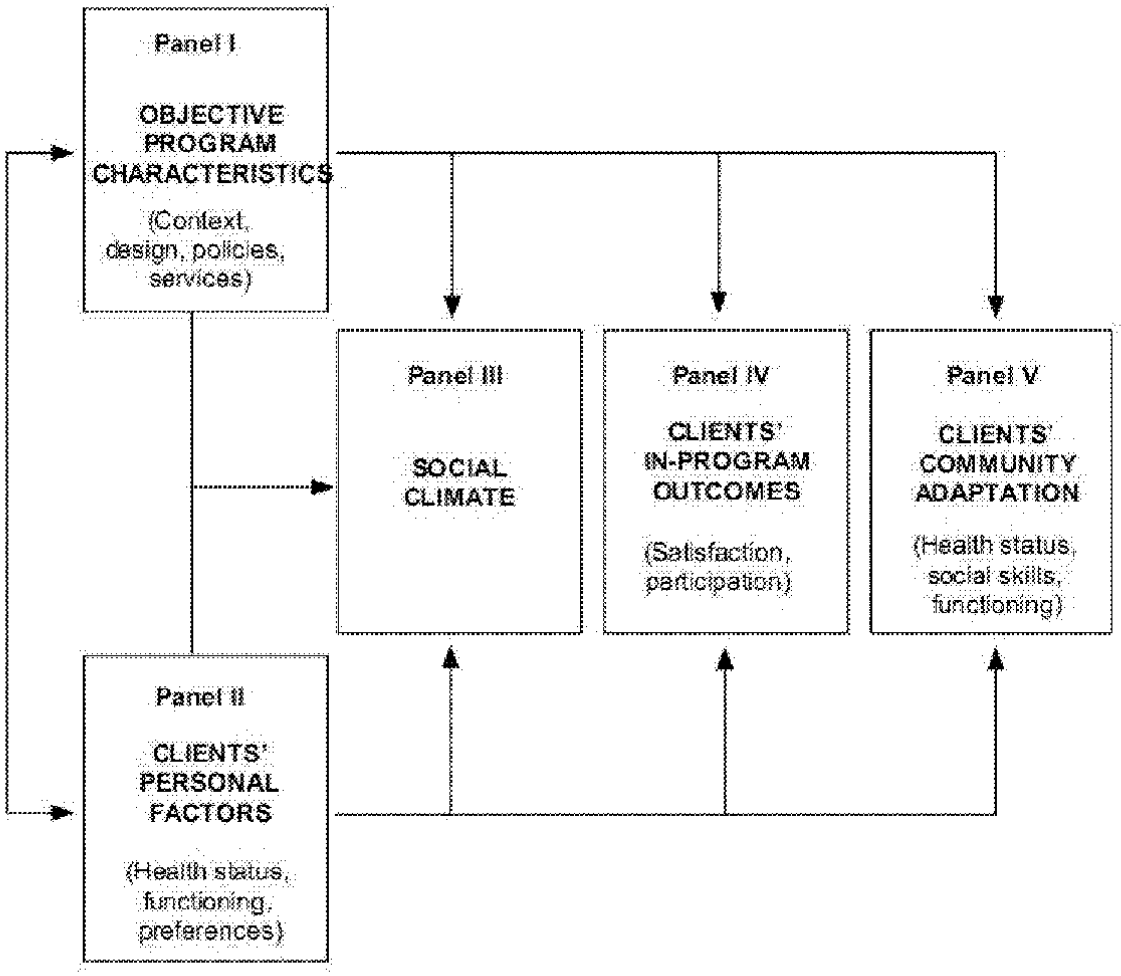
This study is unique among prior OH studies in that it focused entirely on the characteristics of the participants rather than on the processes that occur within the OH itself, such as social support or sense of community. This represents only part of the puzzle of what creates an aftercare environment that is both welcoming and therapeutic.

Substance abuse treatment environments are often viewed as a "black box"; that is, in addition to outcomes, the services and activities offered in differing treatment environments are check-listed, but how these components work together are examined less closely (Moos et al., 1990). Although this study examined the personal characteristics and factors contributing to AOD relapse, the author agrees with the classic community psychology perspective that preventing substance abuse relapse always involves multiple processes. These processes include prevention (recognizing and addressing social milieus that are risky), environmental (creating protective environments, social networks, and a positive social milieu), and both psychological empowerment (teaching life skills, coping strategies, abstinence self-efficacy) and actual

empowerment (agency, gaining employment and job skills, joining supportive groups of like-minded and similarly afflicted persons in self-governing organizations).

Similarly, Moos (1997) proposed that the characteristics of a treatment program and setting will interact with the characteristics of the persons in the environment, which in turn influences the setting's social climate, residents' experiences and personal and community re-integration outcomes (Figure 1). The author's Master's Thesis compared OH and a TC on the Objective Program Characteristics (Panel I) and their effects on Social Climate (Panel III) (Harvey & Jason, 2011). This study focused on examining Clients' Personal Factors (Panel II) and the in-program outcomes (Panel IV). What remains is to examine the factors on Panel V, Community Adaptation.

Figure 3. Conceptual Model of Personal Characteristics, Program Characteristics, and Outcomes in Treatment Settings (Moos, 1997)



One possible framework to examine community adaptation is evolving from recent papers emphasizing "recovery capital" (Cloud & Granfield, 2008; Lyons & Lurigio, 2010; White & Cloud, 2008). Recovery capital seeks to enhance recovery by strengthening the inner and external resources that are needed and vary from person to person to initiate and sustain recovery from problematic AOD use. Although an emerging construct, recovery capital resources are generally classified as personal (self-efficacy, knowledge, personal health, education, hope, employment, financial assets, transport); social (supportive, pro-recovery relationships with family and significant others, peer-mentors, recovery and support groups), and community

(treatment resources and support services, social acceptance and lack of stigma, continuum of care resources, non-AOD support services for mental and physical health). Community capital also includes cultural capital in which cultural attitudes about the various processes of recovery are known and culturally appropriate for the each person. Recovery capital is a synergistic concept that seeks to end AOD use and replace it with a more self-directed, self-actualized and sustained recovery process.

Per Figure 3, if one accepts the notion that social climate is the interaction of objective characteristics of the therapeutic program and the characteristics of the people in the program, then participants living in various treatment settings are a potentially rich source of recovery capital. Future research on differing treatment methods and aftercare settings and how these settings encourages the creation of recovery capital is needed.

An early empirical study to begin to answer these questions was conducted by Laudet and White with 312 inner-city, mostly minority participants in various stages of recovery (Laudet & White, 2008). Laudet and White examined the relationship of specific components of recovery capital and their relative importance among four stages (time periods) of recovery: under 6 months, 6 to 18 months, 18 to 36 months, and more than three years. They had two general hypotheses: that increases in recovery capital (operationalized as measurements of social support, stress, spirituality, life meaning, 12-step affiliation, and religiousness) would be associated with fewer relapses, and that these factors would be differentiated across the four stages of recovery.

Laudet and White found some support for their hypotheses. For the entire sample, increases in recovery capital in the form of 12-step involvement and life meaning significantly predicted fewer relapse occurrences. For their stages hypotheses, stress reduction was the only significant factor for the under 6 months group; 12-step involvement only for the 6 to 18 month group; and general social support only for the greater than three years group. No factors were significant for the 18 to 36 month group. This findings suggest that a setting must be flexible

enough to meet the needs of heterogeneous groups who are at various stages of recovery (time-wise), but are directed enough to be purposeful.

In the author's view, the OH model is breathtaking in its simplicity. By providing sober housing in a self-financed, self-governing social structure, OHs provide recovery capital intuitively. Although an OH is not "treatment," it is clearly therapeutic and adds to recovery capital. But OH is not effective for everyone; prior OH research has found that stays of longer than six months are necessary for better outcomes compared to other treatment settings, and many people leave OH before this six month does (Jason et al., 2007b; Stevens et al., 2010). Put simply, what makes an OH (and like environments) both welcoming and therapeutic, and for whom, and how much time living in an OH is required to be effective?

Recovery capital can give practitioners a framework and language to begin to answer these questions. Ideally, an OH should be flexible enough for members to accumulate recovery capital based on their specific needs as a result of pragmatic human interactions that are not special in and of themselves, but take on special meaning in an OH setting. These include friendship among OH residents (personal recovery capital), the social support among OH residents (social recovery capital), and the social-reintegration that results from OHs being located in mainstream communities (community and cultural recovery capital). However, at this time, the author is not yet convinced that recovery capital can uniquely explain the processes of recovery to a greater degree than competing theories, such a Conservation of Resources (COR) theories (Walt, Stevens, Jason, & Ferrari, 2012). Indeed, as of this writing, a database-wide search of DePaul's online library system using the words "recovery" and "capital" in the title search and "substance abuse" as a subject term yields only ten articles. The author hopes to contribute to this discussion.

This study has two areas of limitations that should be addressed: the limitations of survival analysis techniques, and the scope and nature of the sample data.

First, survival analytic techniques bring to fore the presence of censored cases. Recall that in terms of survival analysis, cases are censored when it is unknown or unknowable whether

the person experienced or will ever experience relapse - the event in question. Censoring in general (and this study in particular) occurs for three main reasons: the participants are lost to drop outs during the study, the study ended before the event occurred, and some participants never experienced and will never experience relapse. Censoring of data is inevitable and unavoidable in longitudinal studies (Singer & Willett, 2003).

In this study, censoring accounted for a total of 189 participants, or approximately 70.5% of the sample. This includes 87 persons who did not experience relapse and remained abstinent by the end of the study, and 102 participants who dropped out during some point in the study. Although it appears that a significant (and perhaps unacceptable) number of cases in this study were censored, it is the nature of the censoring mechanism that is more important. In survival analysis terms, the censoring mechanism was *non-informative* for the 87 persons who did not relapse. This is because there is no systematic reason for censoring other than the fact that the study ended. The only way to avoid non-informative censoring of this type if the original study could have proceeded indefinitely until all participants had relapsed, which is of course impractical and cost-prohibitive.

If a participant dropped out because of an unforeseen or random occurrence, such as moving to be close to a sick relative, or simply losing contact with the researchers, then the censoring mechanism is also non-informative. The mechanism for censoring is potentially informative if – and only if – the reasons for not knowing event occurrence are related to factors connected to relapse. In some unknown number of cases, some of the 102 participants presumably dropped out of the study because they began using drugs or drinking, left their OH without forwarding information, and were thus lost to follow-up. It is also possible that some persons reached a tipping point and experienced a psychiatric crisis that required hospitalization, or preceded a drinking or using episode. This is an *informative* censoring mechanism because individuals in this group likely differed systematically compared to the non-censored group.

Unfortunately, there is no way of knowing whether this kind of censoring is random or systematic post-hoc. (Of course, researchers of random control trials are careful to design studies

from the outset to reduce as much non-random, potentially informative censoring as possible. . As there were no significant differences across any of the baseline variables among the groups that dropped out, relapsed, or remained in the study to the end, it appeared that no systematic differences seemed to be in play in this study.) Related to censoring, both Kaplan-Meier and Cox proportional hazard analyses assume that hazard is constant across time. This assumption is difficult to control for in longitudinal studies using naturalistic settings without random assignments (Singer & Willett, 2003).

Although a significant number of cases in this study were censored, this study's data were not censored to unacceptable level according to survival analysis texts, or compared to other longitudinal studies of AOD treatment that can be as high as 75-80% (Allison, 2010; Burton, Johnson, & Ritter, 1996). Also, one of the major advantages of survival analysis techniques is that all data is used in each discrete time period to calculate risk hazard and survival times, whereas in traditional analytic methods, drop outs and missing data are often discarded, ignored, or artificially dichotomized (Singer & Willett, 2003). Thus, the censoring present in this study is acceptable.

The second limitation of this study is the data components used that were in the NIDA dataset per that study's design. The real question of this study is, why do people living in OH drink or use again? Ideally, survival analysis works best when large amounts of data related to the outcome are gathered at baseline, particularly data that are expected to vary across time. If gathered at each time point, this data (ideally) reflects the processes that change across time that strengthen or weaken. The ASI is used as a clinical instrument to assess treatment needs and to provide targeted services during intake procedures; in this study, the ASI measures were used as an outcome predictor. Although this is not unusual to use the ASI to predict outcomes (Hanlon, O'Grady, & Bateman, 2000), the author prefers this study be viewed informing needs assessments for new OH residents.

The main purpose of the NIDA study was to examine the hypothesized positive influences - increases in self-efficacy and social support, among other – on such as cumulative

abstinence rates (Jason et al., 2007a). The NIDA study could also compare those living in an OH over a continuous period of time compared to those who lived in an OH for more limited lengths of time, or who left OH during the study. For practical (rather than methodological) reasons, many of the measures used in the NIDA were staggered across every other wave. Discrete-time hazard models used in this study required the presence of data across all four waves.

Although informative on these outcomes, the NIDA study's data was not entirely suited for discrete-time survival analysis techniques, particularly those using time-varying data. As such, the only time-varying data suitable for this study was alcohol and drug abstinence self-efficacy. Although there is a substantial body of research indicating that employment and income are strong predictors of continued abstinence, the lack of time-varying employment data for this study is a major limitation. Also, there are no distinctions among this sample to designate primary AOD of choice or the substance(s) most problematic for the sample. As alcohol abstinence self-efficacy increases significantly reduced hazard rates in this study, lacking the ability to distinguish primary drug of choice to explore potential interactions is unfortunate.

Conclusion

This study used the 2002 NIDA data set to analyze a group of relatively new OH residents to determine what factors affected their overall risk of relapse. Even if half of the hypotheses were not supported, its findings that addiction severity significantly impacted the risk of relapse are potentially useful to ongoing and future OH studies, the OH organization, and studies of recovery homes in general to focus treatment and encourage longer stay at an OH, and hopefully, greater successes at preventing relapse.

The author's ultimate career goals is to do international community psychology research. This project was conceived out of a project idea to pilot Oxford House-style recovery residences in Bulgaria. Oxford House-like aftercare setting would be the first of its kind in Eastern Europe; as such, there would be significant pressure for the first house to succeed. Referring to Figure 3, the Objective Program Characteristics of an OHs are: a communal dwelling suitable to house a critical number of interacting residents; residents willing to live together and adhere by a common set of rules; jobs and/or income for residents to be self-supporting; official and institutional support or permission (i.e. governments must allow them to function); and community support (i.e. NIMBY) (Harvey, Mortensen, Aase, Jason, & Ferrari, 2013). The question that this study has begun to answer is, what characteristics of residents entering OH (in the USA, Bulgaria, or anywhere in the world) would be at greater risk of relapse? This study answers at least part of this question.

The author benefitted from carrying out this study in at least two ways. First, the author became familiar with survival analysis techniques, a subject that was completely unknown to him at the outset when this study was first conceived. The author is now convinced that survival analysis techniques offer a valuable set of tools to examine longitudinal data with distinct advantages over other methods. Specifically, survival analysis offers a rational way to handle censored data, which are always included in the calculations of survival and hazard. Thus, no data is wasted or discarded. However, a study's data collection procedures must be designed to support survival analysis techniques. As such, the author will forever be mindful of these

requirements when designing longitudinal studies that focus on event occurrence, and will advocate including provisions for survival analysis if cost and efforts permit.

Related to this, the author benefited from undertaking this study in an unanticipated area. It is a testimony to the NIDA study's design and implementation that potentially useful and informative information still exist in these data over a decade after the study ended. The simple fact that useful information can still exist so many years after the end of a study was deeply impactful. This fact will always be on the author's mind when designing a study and gathering data throughout his research career.

Again, the author takes the wider view that preventing substance abuse relapse always involves multiple processes integral to community psychology. These factors include prevention, creating positive, protective environments, expanding social networks, and enhancing both psychological and actual empowerment. The author hopes that the results of this study using somewhat pessimistic analysis of AOD relapse can inform positive, affirming interventions for aftercare environments.

References

AA World Services. (1957). *Alcoholics Anonymous Comes of Age: A Brief History of AA*. Grand Central Station, New York: Alcoholics Anonymous World Services

Problems Other than Alcohol, The A.A. Grapevive, Inc 1-8 (1958).

AA World Services. (1984). This is A.A.: An Introduction to the A.A. Recovery Program (4th ed.). New York, NY: Alcoholics Anonymous World Services, Inc.

AA World Services. (2005). *The AA Group*. New York, NY: Alcoholics Anonymous World Services, Inc.

Aase, D. M., Jason, L. A., Olson, B. D., Majer, J. M., Ferrari, J. R., Davis, M. I., & Virtue, S. M. (2009). A Longitudinal Analysis of Criminal and Aggressive Behaviors Among a National Sample of Adults in Mutual-Help Recovery Homes. [Article]. *Journal of Groups in Addiction & Recovery, 4*(1/2), 82. doi: 10.1080/15560350802712454

Aase, D. M., Jason, L. A., & Robinson, W. L. (2008). 12-step participation among dually-diagnosed individuals: A review of individual and contextual factors. *Clinical Psychology Review, 28*(7), 1235-1248.

Allison, P. D. (2010). *Survival Analysis Using SAS®: A Practical Guide* (Second ed.). Cary, North Carolina: SAS Institute Inc.

Annis, H. M., & Graham, J. M. (1988). Situational confidence questionnaire. Toronto: Addiction Research Foundation.

Annis, H. M., & Martin, G. (1985a). The Drug Taking Confidence Questionnaire. Toronto, Ontario: Addiction Research Foundation.

Annis, H. M., & Martin, G. (1985b). Inventory of drug taking situations. Toronto: Addiction Research Foundation.

Ashton, M. (2008). The new abstentionists. *Drugscope (www. drugscope. org. uk)*, 1-25.

Babor, T. F., & Del Boca, F. K. (Eds.). (2003). *Treatment matching in alcoholism*. New York, NY US: Cambridge University Press.

Baldwin, M. L., Marcus, S. C., & De Simone, J. (2010). Job loss discrimination and former substance use disorders. *Drug and alcohol dependence, 110*, 1-7. doi: 10.1016/j.drugalcdep.2010.01.018

Bandura, A. (1997). *Self-efficacy: The Exercise of Control*. New York, NY: Freeman Publishing.

Barrows, D. C. (1998). The community orientation of social model and medical model recovery programs. *Journal of Substance Abuse Treatment, 15*(1), 55-64.

Beasley, C. R., Jason, L. A., Miller, S. A., Stevens, E., & Ferrari, J. R. (2013). Person–environment interactions among residents of Oxford Houses. *Addiction Research & Theory, 21*(3), 198-206. doi: 10.3109/16066359.2012.703270

Beattie, M. C., & Longabaugh, R. (1999). General and alcohol-specific social support following treatment. *Addictive Behaviors, 24*(5), 593-606.

Bishop, P. D., Jason, L. A., & Ferrari, J. R. (1998). A survival analysis of communal-living, self-help, addiction recovery participants. [Article]. *American Journal of Community Psychology, 26*(6), 803-821.

Borkman, T., Kaskutas, L. A., & Owen, P. (2007). Contrasting and converging philosophies of three models of alcohol/other drugs treatment: Minnesota model, social model, and addiction therapeutic communities. *Alcoholism Treatment Quarterly, 25*(3), 21-38.

Borkman, T. J., Kaskutas, L. A., Room, J., Bryan, K., & Barrows, D. (1998). An historical and developmental analysis of social model programs. *Journal of Substance Abuse Treatment, 15*(1), 7-17.

Brown, S. A., Vik, P. W., Patterson, T. L., Grant, I., & Schuckit, M. a. (1995). Stress, vulnerability and adult alcohol relapse. *Journal of studies on alcohol, 56*, 538-545.

Brown, T. G., Seraganian, P., Tremblay, J., & Annis, H. (2002). Matching substance abuse aftercare treatments to client characteristics. *Addictive behaviors, 27*, 585-604.

Brownell, K. D., Marlatt, G. a., Lichtenstein, E., & Wilson, G. T. (1986). Understanding and preventing relapse. *The American psychologist, 41*, 765-782.

Bühringer, G. (2012). The mountain roared and brought forth a mouse*: comments on the results of an expert panel on standardization of drug dependence treatment trial outcome variables. *Addiction, 107*(4), 722-723. doi: 10.1111/j.1360-0443.2011.03689.x

Burton, R. P. D., Johnson, R. J., & Ritter, C. (1996). The effects of role socialization on the initiation of cocaine use: an event history analysis from adolescence into middle adulthood. [Article]. *Journal of Health & Social Behavior, 37*, 75-90. doi: 10.2307/2137232

CDC. (2011). HIV infection—United States, 2005 and 2008. (Vol. 60(01)(suppl), pp. 87–89.): MMWR 2011.

Chicago Area Service Office. (2011). Chicago City AA Meeting Directory. Chicago, IL: Chicago Area Service Office of Alcoholics Anonymous.

Cloud, W., & Granfield, R. (2008). Conceptualizing recovery capital: Expansion of a theoretical construct. *SUBSTANCE USE & MISUSE, 43*(12-13), 1971-1986. doi: 10.1080/10826080802289762

Condelli, W. S., & Hubbard, R. L. (1994). Relationship between time spent in treatment and client outcomes from therapeutic communities. *Journal of Substance Abuse Treatment, 11*(1), 25-33. doi: 10.1016/0740-5472(94)90061-2

Connors, G. J., Maisto, S. A., & Donovan, D. M. (1996). Conceptualizations of relapse: a summary of psychological and psychobiological models. *Addiction (Abingdon, England), 91 Suppl*, S5-13.

Davis, M. I., & Jason, L. A. (2005). Sex Differences in Social Support and Self-Efficacy Within a Recovery Community. *American Journal of Community Psychology, 36*(3), 259-274.

De Leon, G. (1989). Therapeutic communities for substance abuse: Overview of approach and effectiveness. *Psychology of Addictive Behaviors, 3*(3), 140-147.

De Leon, G. (2000). *The Therapeutic Community: Theory, Model, and Method* New York, NY: Springer Publishing Company, Inc.

De Leon, G. (2004). Commentary on "Self-help organizations for alcohol and drug problems: Toward evidence-based practice and policy". *Journal of Substance Abuse Treatment, 26*(3), 163-165.

Dearing, R. L., Barrick, C., Dermen, K. H., & Walitzer, K. S. (2005). Indicators of Client Engagement: Influences on Alcohol Treatment Satisfaction and Outcomes. *Psychology of Addictive Behaviors, 19*(1), 71-78. doi: 10.1037/0893-164x.19.1.71

Del Boca, F. K., & Darkes, J. (2012). "Nothing is more practical than a good theory": Outcome measures in addictions treatment research. *Addiction, 107*(4), 719-720. doi: 10.1111/j.1360-0443.2011.03647.x

Dennis, M. L., Scott, C. K., & Foss, M. a. (2003). Factors influencing initial and longer-term responses to substance abuse treatment: a path analysis. *Evaluation and Program Planning, 26*, 287-295. doi: 10.1016/S0149-7189(03)00033-8

Des Jarlais, D. C., Braine, N., & Friedmann, P. (2007). Unstable Housing as a Factor for Increased Injection Risk Behavior at US Syringe Exchange Programs. *AIDS and Behavior, 11*, 78-84. doi: 10.1007/s10461-007-9227-6

DiClemente, C. C., Carbonari, J. P., Montgomery, R. P. G., & Hughes, S. O. (1994). The Alcohol Abstinence Self-Efficacy scale. *Journal of Studies on Alcohol, 55*(2), 141-148.

DiClemente, C. C., Fairhurst, S. K., & Piotrowski, N. A. (1995). Self-efficacy and addictive behaviors. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application.* (pp. 109-141). New York, NY US: Plenum Press.

DiClemente, C. C., Schlundt, D., & Gemmell, L. (2004). Readiness and Stages of Change in Addiction Treatment. [Article]. *American Journal on Addictions, 13*(2), 103-119.

Donovan, D. M. (2003). Relapse prevention in substance abuse treatment. In J. L. Sorensen, R. A. Rawson, J. Guydish & J. E. Zweben (Eds.), *Drug abuse treatment through collaboration: Practice and research partnerships that work.* (pp. 121-137). Washington, DC US: American Psychological Association.

Donovan, D. M., Bigelow, G. E., Brigham, G. S., Carroll, K. M., Cohen, A. J., Gardin, J. G., Hamilton, J. A., Huestis, M. A., Hughes, J. R., Lindblad, R., Marlatt, G. A., Preston, K. L., Selzer, J. A., Somoza, E. C., Wakim, P. G., & Wells, E. A. (2012). Primary outcome indices in illicit drug dependence treatment research: systematic approach to selection and measurement of drug use end-points in clinical trials. *Addiction, 107*(4), 694-708. doi: 10.1111/j.1360-0443.2011.03473.x

Drake, R. E., Wallach, M. a., & McGovern, M. P. (2005). Future directions in preventing relapse to substance abuse among clients with severe mental illnesses. *Psychiatric services (Washington, D.C.), 56*, 1297-1302. doi: 10.1176/appi.ps.56.10.1297

Ekendahl, M. (2007). Aftercare and compulsory substance abuse treatment: a venture with potential. *Contemporary Drug Problems*.

El-Sheikh, S. E.-G., & Bashir, T. Z. (2004). High-risk relapse situations and self-efficacy: comparison between alcoholics and heroin addicts. *Addictive behaviors, 29*, 753-758. doi: 10.1016/j.addbeh.2004.02.003

Etheridge, R., Craddock, S., & Dunteman, G. (1995). Treatment services in two national studies of community-based drug abuse treatment programs. *Journal of Substance Abuse*, 9-26.

Ferrari, J. R., Groh, D. R., & Jason, L. A. (2009). The Neighborhood Environments of Mutual-Help Recovery Houses: Comparisons by Perceived Socioeconomic Status. [Article]. *Journal of Groups in Addiction & Recovery, 4*(1/2), 100. doi: 10.1080/15560350802712470

Ferrari, J. R., Jason, L. A., Blake, R., Davis, M. I., & Olson, B. D. (2006a). 'This is my neighborhood': Comparing United States and Australian Oxford House neighborhoods. *Journal of Prevention & Intervention in the Community, 31*(1-2), 41-49. doi: 10.1300/J005v31n01_04

Ferrari, J. R., Jason, L. A., Davis, M. I., Olson, B. D., & Alvarez, J. (2004). Similarities and differences in governance among residents in drug and/or alcohol misuse recovery: Self vs. staff rules and regulations. *Therapeutic Communities, 25*(3), 185-198.

Ferrari, J. R., Jason, L. A., Olson, B. D., Davis, M. I., & Alvarez, J. (2002). Sense of community among Oxford House residents recovering from substance abuse: Making a house a home. In A. T. Fisher, C. C. Sonn & B. J. Bishop (Eds.), *Psychological sense of community: Research, applications, and implications.* (pp. 109-122). New York, NY US: Kluwer Academic/Plenum Publishers.

Ferrari, J. R., Jason, L. A., Sasser, K. C., Davis, M. I., & Olson, B. D. (2006b). Creating a Home to Promote Recovery: The Physical Environments of Oxford House. [Article]. *Journal of Prevention & Intervention in the Community, 31*(1/2), 27-39.

Finney, J. W., Moos, R. H., & Chan, D. A. (1981). Length of stay and program component effects in the treatment of alcoholism: A comparison of two techniques for process

analyses. *Journal of Consulting and Clinical Psychology, 49*(1), 120-131. doi: 10.1037/0022-006x.49.1.120

Finney, J. W., Wilbourne, P. L., & Moos, R. H. (2007). Psychosocial treatments for substance use disorders: A guide to treatments that work. In P. E. Nathan & J. M. Gorman (Eds.), (3 ed., pp. 179-202). New York, NY US: Oxford University Press.

Forys, K., McKellar, J., & Moos, R. (2007). Participation in specific treatment components predicts alcohol-specific and general coping skills. *Addictive Behaviors, 32*(8), 1669-1680.

Freudenberg, N., Daniels, J., Crum, M., Perkins, T., & Richie, B. E. (2005). Coming home from jail: the social and health consequences of community reentry for women, male adolescents, and their families and communities. *American journal of public health, 95*, 1725-1736. doi: 10.2105/AJPH.2004.056325

Gossop, M., Stewart, D., Browne, N., & Marsden, J. (2002). Factors associated with abstinence, lapse or relapse to heroin use after residential treatment: protective effect of coping responses. *Addiction, 97*, 1259-1267.

Grant, B. F., Stinson, F. S., Dawson, D. A., Chou, P., Dufour, M. C., Compton, W., Pickering, R. P., & Kaplan, K. (2004). Prevalence and Co-occurrence of Substance Use Disorders and Independent Mood and Anxiety Disorders: Results From the National Epidemiologic Survey on Alcohol and Related Conditions. *Archives of General Psychiatry, 61*(8), 807-816. doi: 10.1001/archpsyc.61.8.807

Groh, D. R., Jason, L. A., Davis, M. I., Olson, B. D., & Ferrari, J. R. (2007). Friends, Family, and Alcohol Abuse: An Examination of General and Alcohol-Specific Social Support. [Article]. *American Journal on Addictions, 16*(1), 49-55. doi: 10.1080/10550490601080084

Groh, D. R., Jason, L. A., Ferrari, J. R., & Davis, M. I. (2009). Oxford House and Alcoholics Anonymous: The Impact of Two Mutual-Help Models on Abstinence. [Article]. *Journal of Groups in Addiction & Recovery, 4*(1/2), 23. doi: 10.1080/15560350802712363

Hanlon, T. E., O'Grady, K. E., & Bateman, R. W. (2000). Using the Addiction Severity Index to Predict Treatment Outcome Among Substance Abusing Parolees. *Journal of Offender Rehabilitation, 31*, 67-79. doi: 10.1300/J076v31n03_04

Harvey, R., & Jason, L. (2011). Contrasting Social Climates of Small Peer-Run Versus a Larger Staff-Run Substance Abuse Recovery Setting. [Article]. *American Journal of Community Psychology, 48*(3/4), 365-372. doi: 10.1007/s10464-011-9432-3

Harvey, R., Mortensen, J., Aase, D., Jason, L., & Ferrari, J. (2013). Factors Affecting the Sustainability of Self-Run Recovery Homes in the United States. [Journal Article]. *International Journal of Self-Help & Self-Care, 7*(1), 99-109.

Hitchcock, H. C., Stainback, R.D., Roque, G.M. , Stainback, R. D., & Roque, G. M. (1995). Effects of halfway house placement on retention of patients in substance abuse aftercare. *American Journal of Alcohol and Drug Abuse, 21*, 379-390.

Hser, Y.-I., & Anglin, M. D. (2011). Addiction treatment and recovery careers. In J. F. Kelly & W. L. White (Eds.), *Addiction recovery management: Theory, research and practice.* (pp. 9-29). Totowa, NJ US: Humana Press.

Hubbard, R. L., Craddock, S. G., & Anderson, J. (2003). Overview of 5-year followup outcomes in the drug abuse treatment outcome studies (DATOS). *Journal of Substance Abuse Treatment, 25*(3), 125-134. doi: 10.1016/s0740-5472(03)00130-2

Humphreys, K., Mankowski, E. S., Moos, R. H., & Finney, J. W. (1999). Do enhanced friendship networks and active coping mediate the effect of self-help groups on substance abuse? *Annals of Behavioral Medicine, 21*(1), 54-60.

Iceland, J. (1997). The dynamics of poverty spells and issues of left-censoring. *Ann Arbor, MI: Population Studies Center.*

Ilgen, M., McKellar, J., & Tiet, Q. (2005). Abstinence Self-Efficacy and Abstinence 1 Year After Substance Use Disorder Treatment. *Journal of Consulting and Clinical Psychology, 73*(6), 1175-1180. doi: 10.1037/0022-006x.73.6.1175

Ilgen, M., Tiet, Q., Finney, J., & Moos, R. H. (2006). Self-efficacy, therapeutic alliance, and alcohol-use disorder treatment outcomes. *Journal of Studies on Alcohol, 67*(3), 465-472.

Janzen, R. A. (2001). *The rise and fall of Synanon: a California utopia.* United States of America: Johns Hopkins Univ. Press.

Jason, L. A., Davis, M. I., & Ferrari, J. R. (2007a). The need for substance abuse after-care: A Longitudinal analysis of Oxford House. *Addictive Behaviors 32*, 803–818.

Jason, L. A., Ferrari, J. R., Smith, B., Marsh, P., Dvorchak, P. A., Groessl, E. J., Pechota, M. E., Curtin, M., Bishop, P. D., Kot, E., & Bowden, B. S. (1997). An exploratory study of male recovering substance abusers living in a self-help, self-governed setting. *Journal of Mental Health Administration, 24*(3), 332-339. doi: 10.1007/bf02832666

Jason, L. A., Olson, B. D., Ferrari, J. R., & Davis, M. I. (2003). Substance abuse: The need for second-order change. *International Journal of Self Help and Self Care, 2*, 91-109.

Jason, L. A., Olson, B. D., Ferrari, J. R., Layne, A., Davis, M. I., & Alvarez, J. (2003). A Case Study of Self-Governance in a Drug Abuse Recovery Home. *North American Journal of Psychology, 5*(3), 499-514.

Jason, L. A., Olson, B. D., Ferrari, J. R., & Lo Sasso, A. T. (2006). Communal Housing Settings Enhance Substance Abuse Recovery. *American Journal of Public Health, 96*(10), 1727-1729.

Jason, L. A., Olson, B. D., Ferrari, J. R., Majer, J. M., Alvarez, J., & Stout, J. (2007b). An examination of main and interactive effects of substance abuse recovery housing on multiple indicators of adjustment. *Addiction, 102*(7), 1114-1121.

Jason, L. A., Olson, B. D., & Harvey, R. (submitted for review). Evaluating Alternative Aftercare Models for Ex-Offenders.

Johnson, J. E., Finney, J. W., & Moos, R. H. (2005). Predictors of 5-year mortality following inpatient/residential group treatment for substance use disorders. *Addictive behaviors, 30*, 1300-1316. doi: 10.1016/j.addbeh.2005.01.005

Kemp, K., Savitz, B., Thompson, W., & Zanis, D. A. (2004). Developing Employment Services for Criminal Justice Clients Enrolled in Drug User Treatment Programs. [Article]. *SUBSTANCE USE & MISUSE, 39*(13-14), 2491-2511. doi: 10.1081/ja-200034691

Khantzian, E. J. (2003). The self-medication hypothesis revisited: The dually diagnosed patient. *Primary Psychiatry.*

Khantzian, E. J., & Mack, J. E. (1994). How AA Works and Why It's Important for Clinicians to Understand. *Journal of Substance Abuse Treatment, 11*(2), 77-92.

Korn, P. (2013). Methadone finds its way into clean, sober housing, *Portland Tribune,* pp. 10-12.

Kushner, M. G., Abrams, K., Thuras, P., Hanson, K. L., Brekke, M., & Sletten, S. (2005). Follow-up Study of Anxiety Disorder and Alcohol Dependence in Comorbid Alcoholism Treatment Patients. *Alcoholism: Clinical and Experimental Research, 29*(8), 1432-1443. doi: 10.1097/01.alc.0000175072.17623.f8

Langdon, P. E., Yágüez, L., Brown, J., & Hope, A. (2001). Who walks through the ' revolving-door ' of a British psychiatric hospital ? , 525 - 533. doi: 10.1080/09638230120041281

Laudet, A. B., Cleland, C. M., Magura, S., Vogel, H. S., & Knight, E. L. (2004a). Social support mediates the effects of dual-focus mutual aid groups on abstinence from substance use. *American journal of community psychology, 34*, 175-185.

Laudet, A. B., Magura, S., & Cleland, C. (2004b). The effect of 12-step-based fellowship participation on abstinence among dually diagnosed persons: a two-year longitudinal study. *of psychoactive drugs*.

Laudet, A. B., Magura, S., Vogel, H. S., & Knight, E. (2000). Recovery challenges among dually diagnosed individuals. *Journal of substance abuse treatment, 18*, 321-329.

Laudet, A. B., Magura, S., Vogel, H. S., & Knight, E. L. (2004c). Perceived Reasons for Substance Misuse Among Persons With a Psychiatric Disorder. *American Journal of Orthopsychiatry, 74*(3), 365-375. doi: 10.1037/0002-9432.74.3.365

Laudet, A. B., Morgen, K., & White, W. L. (2006). The role of social supports, spirituality, religiousness, life meaning and affiliation with 12-step fellowships in quality of life satisfaction among individuals in recovery. *Alcoholism Treatment Quarterly*, 33-73.

Laudet, A. B., & White, W. (2010). What are your priorities right now? Identifying service needs across recovery stages to inform service development. *Journal of Substance Abuse Treatment, 38*(1), 51-59. doi: 10.1016/j.jsat.2009.06.003

Laudet, A. B., & White, W. L. (2008). Recovery capital as prospective predictor of sustained recovery, life satisfaction, and stress among former poly-substance users. *SUBSTANCE USE & MISUSE, 43*(1), 27-54. doi: 10.1080/10826080701681473

Longabaugh, R., Beattie, M., Noel, N., & Stout, R. (1993). The effect of social investment on treatment outcome. *Journal of Studies on Alcohol, 54*(4), 465-478.

Lyons, T., & Lurigio, A. J. (2010). The Role of Recovery Capital in the Community Reentry of Prisoners with Substance Use Disorders. *Journal of Offender Rehabilitation, 49*, 445-455. doi: 10.1080/10509674.2010.510769

Maddux, J. E., Brawley, L., & Boykin, A. (1995). Self-efficacy and healthy behavior: Prevention, promotion, and detection. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application.* (pp. 173-202). New York, NY US: Plenum Press.

Majer, J. M., Jason, L. A., Ferrari, J. R., & Miller, S. A. (2011). 12-Step involvement among a U.S. national sample of Oxford House residents. [Article]. *Journal of Substance Abuse Treatment, 41*(1), 37-44. doi: 10.1016/j.jsat.2011.01.010

Majer, J. M., Jason, L. A., Ferrari, J. R., & North, C. S. (2002). Comorbidity among Oxford House residents: A preliminary outcome study. *Addictive Behaviors, 27*(5), 837-845. doi: 10.1016/s0306-4603(01)00214-3

Majer, J. M., Jason, L. A., Ferrari, J. R., Venable, L. B., & Olson, B. D. (2002). Social support and self-efficacy for abstinence: is peer identification an issue? [Article]. *Journal of Substance Abuse Treatment, 23*(3), 209.

Majer, J. M., Jason, L. a., North, C. S., Ferrari, J. R., Porter, N. S., Olson, B., Davis, M. I., Aase, D. M., & Molloy, J. P. (2008). A longitudinal analysis of psychiatric severity upon outcomes among substance abusers residing in self-help settings. *American journal of community psychology, 42*, 145-153. doi: 10.1007/s10464-008-9190-z

Marlatt, G. A. (1996). Taxonomy of high-risk situations for alcohol relapse: evolution and development of a cognitive-behavioral model. *Addiction (Abingdon, England), 91 Suppl*, S37-49.

Marlatt, G. A., & Donovan, D. M. (Eds.). (2005). *Relapse Prevention: Maintenance Strategies in the Treatment of Addictive Behaviors* (2nd ed.). London: The Guilford Press.

Marlatt, G. A., Tucker, J. A., Donovan, D. M., & Vuchinich, R. E. (1997). Help-seeking by substance abusers: The role of harm reduction and behavioral-economic approaches to facilitate treatment entry and retention. *Beyond the therapeutic alliance: Keeping the drug-dependent individual in treatment*, 44-84.

McCusker, J., Vickers-Lahti, M., Stoddard, A., Hindin, R., Bigelow, C., Zorn, M., Garfield, F., Frost, R., Love, C., & Lewis, B. (1995). The Effectiveness of Alternative Planned Durations of Residential Drug Abuse Treatment. [Article]. *American Journal of Public Health, 85*(10), 1426.

McKay, J. R. (2005). Is there a case for extended interventions for alcohol and drug use disorders? *Addiction (Abingdon, England), 100*, 1594-1610. doi: 10.1111/j.1360-0443.2005.01208.x

McKay, J. R. (2011). Continuing care and recovery. In J. F. Kelly & W. L. White (Eds.), *Addiction recovery management: Theory, research and practice.* (pp. 163-183). Totowa, NJ US: Humana Press.

McKeganey, N., Intosh, J. M. C., & Keganey, N. M. C. (2000). The Recovery from Dependent Drug Use: addicts' strategies for reducing the risk of relapse. *Drugs: Education, Prevention, and, 7*.

McLellan, A. T., Kushner, H., Metzger, D., & Peters, R. (1992). The fifth edition of the Addiction Severity Index. *Journal of Substance Abuse Treatment, 9*(3), 199-213.

McLellan, A. T., Lewis, D. C., O'Brien, C. P., & Kleber, H. D. (2000). Drug Dependence, a Chronic Medical Illness. [Article]. *JAMA: Journal of the American Medical Association, 284*(13), 1689.

Melnick, G., De Leon, G., Thomas, G., & Kressel, D. (2001). A client-treatment matching protocol for therapeutic communities: First report. *Journal of Substance Abuse Treatment, 21*(3), 119-128.

Meyers, R. J., & Miller, W. R. (2001). *A community reinforcement approach to addiction treatment*. New York, NY US: Cambridge University Press.

Miller, P. G., & Miller, W. R. (2009). What should we be aiming for in the treatment of addiction? *Addiction, 104*(5), 685-686. doi: 10.1111/j.1360-0443.2008.02514.x

Miller, W. R. (1996a) Manual for Form-90: A structured assessment interview for drinking and related behaviors. *Project MATCH Monograph Series: Vol. 5*. Rockville, MD: National Institute of Alcohol Abuse and Alcoholism.

Miller, W. R. (1996b). What is a relapse? Fifty ways to leave the wagon. [Article]. *Addiction, 91*, S15-S27.

Miller, W. R., & Del Boca, F. K. (1994). Measurement of drinking behavior using the Form 90 family of instruments. *Journal of Studies on Alcohol*(12), 112-118.

Miller, W. R., Westerberg, V. S., Harris, R. J., & Tonigan, J. S. (1996). What predicts relapse? Prospective testing of antecedent models. *Addiction, 91*.

Moberg, P. D., & Finch, A. J. (2008). Recovery High Schools: A Descriptive Study of School Programs and Students. *Journal of Groups in Addiction & Recovery, 2*, 128-161.

Moggi, F., Ouimette, P. C., Moos, R. H., & Finney, J. W. (1999). Dual diagnosis patients in substance abuse treatment: relationship of general coping and substance-specific coping to 1-year outcomes. *Addiction (Abingdon, England), 94*, 1805-1816.

Moos, R. H. (1996). Understanding environments: The key to improving social processes and program outcomes. *American Journal of Community Psychology, 24*(1), 193-201.

Moos, R. H. (1997). *Evaluating Treatment Environments: The Quality of Psychiatric and Substance Abuse Programs* (2nd ed.). New Brunswick, New Jersey: Transaction Publishers.

Moos, R. H. (2003a). Addictive disorders in context: Principles and puzzles of effective treatment and recovery. *Psychology of Addictive Behaviors, 17*(1), 3-12.

Moos, R. H. (2003b). Social Contexts: Transcending Their Power and Their Fragility. *American Journal of Community Psychology, 31*(1 & 2), 1-13.

Moos, R. H. (2005). Iatrogenic effects of psychosocial interventions for substance use disorders: prevalence, predictors, prevention. *Addiction, 100*(5), 595-604.

Moos, R. H. (2011). Processes that promote recovery from addictive disorders. In J. F. Kelly & W. L. White (Eds.), *Addiction recovery management: Theory, research and practice.* (pp. 45-66). Totowa, NJ US: Humana Press.

Moos, R. H., Finney, J. W., & Cronkite, R. C. (1990). *Alcoholism treatment: Context, process, and outcome*. New York, NY US: Oxford University Press.

Moos, R. H., & Moos, B. S. (2006a). Participation in Treatment and Alcoholics Anonymous: A 16-Year Follow-Up of Initially Untreated Individuals. *Journal of Clinical Psychology, 62*(6), 735-750.

Moos, R. H., & Moos, B. S. (2006b). Rates and predictors of relapse after natural and treated remission from alcohol use disorders. *Addiction, 101*(2), 212-222.

Moos, R. H., Nichol, A. C., & Moss, B. S. (2002). Risk factors for symptom exacerbation among treated patients with substance use disorders. [Article]. *Addiction, 97*(1), 75-85.

Moos, R. H., Pettit, B., & Gruber, V. (1995). Longer episodes of community residential care reduce substance abuse patients' readmission rates. *Journal of Studies on Alcohol, 56*(4), 433-443.

NIDA. (1999). Principles of Drug Addiction Treatment: A Research-Based Guide *No.: NIH 99-4180* (p. 52): Url•: http://www. health. org.

O'Leary, A., & Brown, S. (1995). Self-efficacy and the physiological stress response. In J. E. Maddux (Ed.), *Self-efficacy, adaptation, and adjustment: Theory, research, and application.* (pp. 227-246). New York, NY US: Plenum Press.

Office of Applied Studies. (2008). *Results from the 2007 National Survey on Drug Use and Health: National Findings*. (DHHS Publication No. SMA 08-4343). National Clearinghouse for Alcohol and Drug Information Retrieved from http://oas.samhsa.gov.

Olson, B. D., Viola, J. J., Jason, L. A., Davis, M. I., Ferrari, J. R., & Rabin-Belyaev, O. (2006). Economic costs of oxford house inpatient treatment and incarceration: A preliminary report. *Journal of Prevention & Intervention in the Community, 31*(1-2), 63-72. doi: 10.1300/J005v31n01_06

Orwin, R., & Garrison-Mogren, R. (1999). Retention of homeless clients in substance abuse treatment: Findings from the National Institute on Alcohol Abuse and Alcoholism Cooperative Agreement Program. *... of Substance Abuse ..., 17*, 45-66.

Oxford House Inc. (2004). *Oxford House Manual: An Idea Based On a Sound System For Recovering Alcoholics and Drug Addicts to Help Themselves* Silver Spring, MA: Oxford House World Services, Inc.

Oxford House Inc. (2006). *Oxford House Comes of Age*, Wichita, KA.

Oxford House Inc. (2011a). Oxford House World Council Manual: Working Together to Foster Recovery Without Relapse by Keeping Oxford House True to Its Purpose and Mission. Silver Spring, Maryland: Oxford House World Services, Inc.

Oxford House Inc. (2011b). Oxford House, Inc. Annual Report Fiscal Year 2011. Silver Spring, MD: Oxford House, Inc.

Oxford House Inc. (2012). Oxford House, Inc. Annual Report Fiscal Year 2012. Silver Spring, MD: Oxford House, Inc.

Polcin, D. L., & Henderson, D. M. (2008). A Clean and Sober Place to Live: Philosophy, Structure, and Purported Therapeutic Factors in Sober Living Houses. [Article]. *Journal of Psychoactive Drugs, 40*(2), 153-159.

Popovici, I., French, M. T., & McKay, J. R. (2008). Economic evaluation of continuing care interventions in the treatment of substance abuse: recommendations for future research. *Evaluation review, 32*, 547-568. doi: 10.1177/0193841X08316311

Prinja, S., Gupta, N., & Verma, R. (2010). Censoring in clinical trials: review of survival analysis techniques. *Indian journal of community medicine : official publication of Indian Association of Preventive & Social Medicine, 35*, 217-221. doi: 10.4103/0970-0218.66859

Rabinowitz, J., Mark, M., Popper, M., & Slyuzberg, M. (1995). Predicting revolving-door patients in a 9-year national sample. *Social psychiatry and psychiatric epidemiology, 30*(2), 65-72. doi: 10.1007/bf00794944

Reif, S., Horgan, C. M., Ritter, G. A., & Tompkins, C. P. (2004). The Impact of Employment Counseling on Substance User Treatment Participation and Outcomes. [Article]. *SUBSTANCE USE & MISUSE, 39*(13-14), 2391-2424. doi: 10.1081/ja-200034661

Ridgway, P., & Zipple, A. M. (1990). The paradigm shift in residential services: From the linear continuum to supported housing. *Psychosocial Rehabilitation Journal, 13*(4), 11.

Room, J. A. (1998). Work and identity in substance abuse recovery. [Article]. *Journal of Substance Abuse Treatment, 15*(1), 65.

Rosenheck, R., & Seibyl, C. L. (1997). Effectiveness of treatment elements in a residential-work therapy program for veterans with severe substance abuse. *Psychiatric Services, 48*(7), 928-935.

Rosenquist, J. N., Murabito, J., Fowler, J. H., & Christakis, N. A. (2010). The spread of alcohol consumption behavior in a large social network. *Annals of Internal Medicine, 152*(7), 426. doi: 10.1059/0003-4819-152-7-201004060-00007

Rychtarik, R. G., Prue, D. M., Rapp, S. R., & King, A. C. (1992). Self-efficacy, aftercare and relapse in a treatment program for alcoholics. *Journal of Studies on Alcohol*, 435-440.

Rychtarik, R. G. P. D. M. (1992). Self-efficacy, aftercare and relapse in a treatment program for alcoholics. [Article]. *Journal of Studies on Alcohol, 53*(5), 435.

SAMHSA. (2000). Executive summary and recommendations. TIP 38: Integrating substance abuse treatment and vocational services (Vol. DHHS Publication No. SMA-00-3470). Rockville, MD.

SAMHSA. (2010a). *Substance Abuse and Mental Health Services Administration: Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings*. (HHS Publication No. SMA 10-4586Findings). Rockville, MD. : Office of Applied Studies Retrieved from http://oas.samhsa.gov.

SAMHSA. (2010b). Treatment Episode Data Set (TEDS): 2008. Discharges from Substance Abuse Treatment Services *DASIS Series: S-56,*

(Vol. HHS Publication No. (SMA) 11-4628). Rockville, MD: Substance Abuse and Mental Health Services Administration.

SAMHSA. (2012). SAMHSA's Definition and Guiding Principles of Recovery – Answering the Call for Feedback. from http://blog.samhsa.gov/2011/12/22/samhsa%E2%80%99s-

definition-and-guiding-principles-of-recovery-%E2%80%93-answering-the-call-for-feedback/

SAMHSA Center for Behavioral Health Statistics and Quality. (July 2, 2012). The DAWN Report: Highlights of the 2010 Drug Abuse Warning Network (DAWN) Findings on Drug-Related Emergency Department Visits. Rockville, MD.

Sheedy, C. K., & Whitter, M. (2009). Guiding Principles and Elements of Recovery-Oriented Systems of Care: What Do We Know From the Research? *HHS Publication No. (SMA) 09-4439.* Rockville, MD: Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration.

Simpson, D. D. (2004). A conceptual framework for drug treatment process and outcomes. *Journal of substance abuse treatment, 27*, 99-121. doi: 10.1016/j.jsat.2004.06.001

Singer, J. D., & Willett, J. B. (1991). Modeling the days of our lives: Using survival analysis when designing and analyzing longitudinal studies of duration and the timing of events. *Psychological Bulletin, 110*(2), 268-290. doi: 10.1037/0033-2909.110.2.268

Singer, J. D., & Willett, J. B. (2003). *Applied Longitudinal Data Analysis: Modeling Change and Event Occurrence* (First ed.). New York, NY: Oxford University Press, Inc.

Sklar, S. M., Annis, H. M., & Turner, N. E. (1999). Group comparisons of coping self-efficacy between alcohol and cocaine abusers seeking treatment. *Psychology of Addictive Behaviors, 13*, 123-133. doi: 10.1037//0893-164X.13.2.123

Slaymaker, V. J., & Owen, P. L. (2006). Employed men and women substance abusers: job troubles and treatment outcomes. *Journal of substance abuse treatment, 31*, 347-354. doi: 10.1016/j.jsat.2006.05.008

Stevens, A. (1999). Climbing out of poverty, falling back in: measuring the persistence of poverty over multiple spells. *Journal of Human resources.*

Stevens, E. B., Jason, L. A., Ferrari, J. R., & Hunter, B. (2010). Self-Efficacy and Sense of Community among Adults Recovering from Substance Abuse. [Article]. *North American Journal of Psychology, 12*(2), 255-264.

Substance Abuse Mental Health Services Administration. (2008). *The DASIS Report: Employment Status and Substance Abuse Treatment Admissions 2006.* Rockville, MD: Office of Applied Studies.

Suh, J. J., Ruffins, S., Robins, C. E., Albanese, M. J., & Khantzian, E. J. (2008). Self-medication hypothesis: Connecting affective experience and drug choice. *Psychoanalytic Psychology, 25*, 518-532. doi: 10.1037/0736-9735.25.3.518

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics (5th ed.).* Boston, MA: Allyn & Bacon/Pearson Education.

The Betty Ford Institute Consensus Panel. (2007). What is recovery? A working definition from the Betty Ford Institute. *Journal of Substance Abuse Treatment, 33*, 221 - 228. doi: 10.1016/j.jsat.2007.06.001

Tiffany, S. T., Friedman, L., Greenfield, S. F., Hasin, D. S., & Jackson, R. (2012). Beyond drug use: a systematic consideration of other outcomes in evaluations of treatments for substance use disorders. *Addiction, 107*(4), 709-718. doi: 10.1111/j.1360-0443.2011.03581.x

Tonigan, J. S., Toscova, R., & Miller, W. R. (1995). Meta-analysis of the literature on Alcoholics Anonymous: Sample and study characteristics moderate findings. *Journal of Studies on Alcohol, 57*(1), 65-72.

Vaillant, G. E. (1995). *The natural history of alcoholism revisited.* Cambridge, MA US: Harvard University Press.

Viola, J. J., Ferrari, J. R., Davis, M. I., & Jason, L. A. (2009). Measuring in-group and out-group helping in communal living: helping and substance abuse recovery. *Journal of Groups in Addiction & Recovery, 4*(1-2), 110-128.

Walt, L., Stevens, E. B., Jason, L. A., & Ferrari, J. (2012). Continued Successful SA Recovery during the Maintenance Stage: Intra-Individual Resource Loss & Gain Predict Relapse. *Open Journal of Medical Psychology, 1*(1), 1-7. doi: 10.4236/ojmp.2012.11001.

Walters, G. D. (2002). Lessons Learned From Project MATCH. *Addictive Disorders & Their Treatment, 1*, 135-139. doi: 10.1097/00132576-200211000-00004

Walton, M. A., Blow, F. C., Bingham, C. R., & Chermack, S. T. (2003). Individual and social/environmental predictors of alcohol and drug use 2 years following substance abuse treatment. *Addictive Behaviors, 28*, 627-642. doi: 10.1016/S0306-4603(01)00284-2

Walton, M. A., Reischl, T. M., & Ramanathan, C. S. (1995). Social settings and addiction relapse. *Journal of Substance Abuse, 7*(2), 223-233. doi: 10.1016/0899-3289(95)90006-3

Warner, T. D., & Kramer, J. H. (2008). Closing the Revolving Door?: Substance Abuse Treatment as an Alternative to Traditional Sentencing for Drug-Dependent Offenders. *Criminal Justice and Behavior, 36*, 89-109. doi: 10.1177/0093854808326743

Westerberg, V. S., Miller, W. R., Harris, R. J., & Tonigan, J. S. (1998). The topography of relapse in clinical samples. *Addictive behaviors, 23*, 325-337.

Westhuizen, M. V. D. (2011). Relapse Prevention: Aftercare Services to Chemically Addicted Adolescents. *Social Work, 7*, 26-42.

White, W., & Godley, M. (2003). The history and future of "aftercare.". *4*, 19-21.

White, W., & Kurtz, E. (2006). Linking addiction treatment and communities of recovery: A primer for addiction counselors and recovery coaches. *Pittsburgh, PA: IRETA/NeATTC*, 1-49.

White, W. L. (2007). Can recovering drug addicts drink? A historical footnote. *8*, 36-41.

White, W. L. (2012). The Oxford House story: An interview with Paul Molloy. 1-19.

White, W. L., & Ali, S. (2010). Lapse and Relapse: Is it time for new language? , from www.facesandvoicesofrecovery.org.

White, W. L., & Cloud, W. (2008). Recovery capital: A primer for addictions professionals. *Counselor, 9*, 22-27.

Willett, J. B., & Singer, J. D. (1993). Investigating onset, cessation, relapse, and recovery: Why you should, and how you can, use discrete-time survival analysis to examine event occurrence. *Journal of Consulting and Clinical Psychology, 61*(6), 952-965. doi: 10.1037/0022-006x.61.6.952

Xie, H., McHugo, G. J., Fox, M. B., & Drake, R. E. (2005). Substance abuse relapse in a ten-year prospective follow-up of clients with mental and substance use disorders. *Psychiatric services (Washington, D.C.), 56*, 1282-1287. doi: 10.1176/appi.ps.56.10.1282

Zywiak, W. H., Longabaugh, R., & Wirtz, P. W. (2002). Decomposing the relationships between pretreatment social network characteristics and alcohol treatment outcome. *Journal of Studies on Alcohol, 63*(1), 114-121.

Appendix A. Oxford House Measures from NIDA Study:

Addiction Severity Index, 90-day Timeline Follow Back, Alcohol Abstinence Self-Efficacy Scale (AASE), Drug Abstinence Self-Efficacy Scale (DASE)

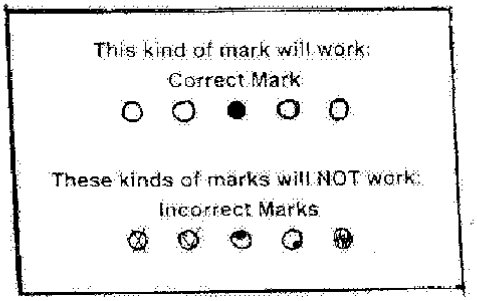
DEPAUL UNIVERSITY

Oxford House Measures
NIDA

W1

Thank you for taking the time and effort to complete the enclosed surveys. Please read the directions carefully and answer each question as honestly as possible. Keep in mind that your answers are CONFIDENTIAL.

Please make sure to fill all circles in completely. If the circles are not completely filled we will not be able to process your data.



Thank you for your participation!

ADDICTION SEVERITY INDEX
LITE Version 1997

GENERAL INFORMATION

Today's Date: _____

For Office Use Only (Do Not Complete)
G1: **ID Number:** _____
G8: **Survey Wave:** _____
G9: **Survey Method:** _____
G11: **Interviewer Code:** _____

_____
Name

_____
House Name

_____
Street Address

_____ _____ (___) _____
City **State** **Zip Code** **Telephone Number**

G2. **SSN:** _____

G10. **Gender:** _____
1 = Male
2 = Female

G14. **How long have you lived at this address?**
____ Years ____ Months

G16. **Date of Birth:** _____

G17. **Race:** _____
1 = Caucasian (not Hispanic)
2 = African American
3 = American Indian
4 = Alaskan Native
5 = Asian
6 = Hispanic/Latino (including those of Spanish origin)
7 = Native Hawaiian
8 = Other Pacific Islander
9 = Other (please specify) _____

G18. **Do you have a religious preference?** _____
1 = Protestant
2 = Catholic
3 = Jewish
4 = Islamic
5 = Other (please specify) _____
6 = None

G19. **Have you been in a controlled environment in the <u>past 30 days</u>?** ***(Oxford House is <u>not</u> considered a controlled environment)***
1= No
2 = Jail
3 = Alcohol or Drug Treatment
4 = Medical Treatment
5 = Psychiatric Treatment
6 = Other (please specify) _____

G20. **How many days?** _____

Date of last drink/alcohol consumption? Month/Day/Year _____

Date of last drug use (other than for medical purposes)? Month/Day/Year _____

Continued on next page

DRUG/ALCOHOL USE

Please use the following scale for questions concerning route (method) of administration:

1 = Oral
2 = Nasal
3 = Smoking
4 = Non-IV injection
5 = IV
6 = More than one route

	How many days in the past 30 days have you used:	How many years in your lifetime have you used:	Route of Administration
D1. Alcohol (any use at all)			
D2. Alcohol (to intoxication)			
D3. Heroin			
D4. Methadone			
D5. Other Opiates/ Analgesics			
D6. Barbiturates			
D7. Sedatives/Hypnotics/Tranquilizers			
D8. Cocaine			
D9. Amphetamines			
D10. Cannabis			
D11. Hallucinogens			
D12. Inhalants			
D13. More than 1 substance per day (including alcohol)			

How many times in your life have you been treated for:
D19. **Alcohol abuse?** _____

D20. **Drug abuse?** _____

How much money would you say you spent during the past 30 days on:
D23. **Alcohol?** _____
D24. **Drugs?** _____

D25. **How many days have you been treated as an outpatient for alcohol or drugs in the past 30 days?** (include AA/NA) _____

How many days in the past 30 days have you experienced:
D26. **Alcohol problems?** _____

D27. **Drug problems?** _____

Please use the following scale for questions D28-D31:

0 = Not at all
1 = Slightly
2 = Moderately
3 = Considerably
4 = Extremely

How troubled or bothered have you been in the past 30 days by these:
D28. **Alcohol problems?** _____

D29. **Drug problems?** _____

How important to you now is treatment for these:

D30. **Alcohol problems?** _____

D31. **Drug problems?** _____

Continued on next page

EMPLOYMENT/SUPPORT STATUS

E1. **Education completed:**
__ Years __ Months
(GED = 12 years)

E2. **Training or technical education completed:**
__ Months

E4. **Do you have a valid driver's license?** ____
0 = No 1 = Yes

E5. **Do you have an automobile available for use?** ____
(Answer No if no valid driver's license.)
0 = No 1 = Yes

E6. **How long was your longest full time job?** ____ Years ____ Months

E7. **Usual or last occupation** (specify in detail) ____

E9. **Does someone contribute the majority of your support?** ____
0 = No
1 = Yes

E10. **Usual employment pattern, past three years?** ____
1 = full-time (40 hrs/wk)
2 = part-time (reg. hours)
3 = part-time (irreg., day work)
4 = student
5 = service
6 = retired/disability
7 = unemployed
8 = in controlled environment
(Oxford House is not considered a controlled environment)

E11. **How many days were you paid for working in the past 30 days?** ____
(include "under the table" work)

E12-E17. **How much money did you receive from the following sources in the past 30 days?**
E12. Employment? (net income) ____
E13. Unemployment compensation? ____
E14. DPA? ____
E15. Pension, benefits or social security? ____
E16. Mate, family or friends? (Money for personal expenses) ____
E17. Illegal? ____

E18. **How many people (dependents other than yourself) depend on you for the majority of their food, shelter, etc.?** ____

E21. **How important is counseling for these employment problems?** ____
0 = Not at all
1 = Slightly
2 = Moderately
3 = Considerably
4 = Extremely

Continued on next page

FAMILY/SOCIAL RELATIONSHIPS

F1. **Marital Status:** _____

1 = Married
2 = Remarried
3 = Widowed
4 = Separated
5 = Divorced
6 = Never Married or Single

F3. **Are you satisfied with this situation?** _____

0 = No
1 = Indifferent
2 = Yes

Please use the following scale for questions F32 and F34:

0 = Not at all
1 = Slightly
2 = Moderately
3 = Considerably
4 = Extremely

F32. **How troubled or bothered have you been in the past 30 days by family problems?** _____

F34. **How important to you now is treatment or counseling for these family problems?** _____

F4. **Usual living arrangements (past 3 years):** _____

1 = With sexual partner & children
2 = With sexual partner alone
3 = With children alone
4 = With parents
5 = With family
6 = With friends
7 = Alone
8 = Controlled Environment ***(OH is not considered a controlled environment)***
9 = No stable arrangements
10 = Multiple arrangements
11 = Oxford House

F6. **Are you satisfied with these arrangements?** _____

0 = No
1 = Indifferent
2 = Yes

Do you live with anyone who:

F7. **Is actively using alcohol ?** _____

0 = No 1 = Yes

F8. **Is actively using non-prescribed drugs?** _____

0 = No 1 = Yes

Have you had significant periods in which you have experienced serious problems getting along with:

	0= No 1 =Yes	
	Past 30 days	**In your life**
F18. Mother		
F19. Father		
F20. Brother/Sister		
F21. Sexual Partner/Spouse		
F22. Children		
F23. Other Significant Family (specify)		
F24. Close Friends		
F25. Neighbors		
F26. Co-workers		

Did anyone abuse you?	0 = No 1 = Yes	
	Past 30 days	**In your life**
F28. Physically?		
F29. Sexually?		

How many days in the past 30 days have you had serious conflicts:

F30. With your family? _____

F31. With other people (excluding family)? _____

Continued on next page

LEGAL SATUS

L1. **Was your decision to enter Oxford House prompted or suggested by the criminal justice system?** _____
0 = No
1 = Yes

L2. **Are you on parole or probation?** _____
0 = No
1 = Yes

How many times in your life have you been arrested and charged with the following:

L3. Shoplifting/Vandalism _____
L4. Parole/Probation Violation _____
L5. Drug Charges _____
L6. Forgery _____
L7. Weapons Offense _____
L8. Burglary/Larceny/B&E _____
L9. Robbery _____
L10. Assault _____
L11. Arson _____
L12. Rape _____
L13. Homicide/Manslaughter _____
L14. Prostitution _____
L15. Contempt of Court _____
L16. Other (Please specify) _____

L17. **How many of these charges resulted in convictions?** _____

How many times in your life have you been charged with the following:

L18. Disorderly conduct, vagrancy, public intoxication? _____

L19. Driving while intoxicated? _____

L20. Major driving violations? _____

L21. **How many months were you incarcerated in your life?** _____

L24. **Are you presently awaiting charges, trial, or sentence?** _____
0 = No
1 = Yes

L25. **What for?** _____
(Use the number for the type of crime committed in questions L3-L16, and L18-L20; If more than one, use most severe)

L26. **How many days in the <u>past 30 days</u> were you detained or incarcerated?** _____

L27. **How many days in the <u>past 30 days</u> have you engaged in illegal activities for profit?** _____

Please use the following scale for questions L28 and P29:
0 =Not at all
1 = Slightly
2 = Moderately
3 = Considerably
4 = Extremely

L28. **How serious do you feel your <u>present</u> legal problems are?** _____

L29. **How important to you <u>now</u> is counseling or referral for these legal problems?** _____

Continued on the next page

MEDICAL STATUS

M1. **How many times in your life have you been hospitalized for medical problem?** _____
(Include O.D.'s, D.T.'s, Exclude detox, alcohol/drug psychiatric treatment and childbirth (if no complications). Include the number of ***overnight*** hospitalizations for medical problems.

M4. **Are you taking any prescribed medication on a regular basis for a physical problem?** _____
0 = No 1 = Yes

M5. **Do you receive pension for physical disability?** (Exclude psychiatric disability.)
0 = No 1= Yes _____ (please specify)

M6. **How many days have you experienced medical problems in the past 30 days?** _____

Please use the following scale for questions M7 and M8:
0= Not at all
1= Slightly
2 = Moderately
3 = Considerably
4 = Extremely

M7. **How troubled or bothered have you been in the past 30 days?** _____

M8. **How important to you now is treatment for these medical problems?** _____

PSYCHIATRIC STATUS

How many times have you been treated for any psychological or emotional problems:

P1. In a hospital or inpatient setting? _____

P2. Outpatient/private patient? _____

P3. **Do you receive a pension for psychiatric disability?** _____
0 = No
1 = Yes

Have you had a significant period of time (that was not a direct result of alcohol/drug use) in which you have:

	0 = No 1= Yes past 30 days	lifetime
P4. Experienced serious depression-sadness, hopelessness, loss of interest, difficulty with daily function?		
P5. Experienced serious anxiety/tension, uptight, unreasonably worried, inability to feel relaxed?		
P6. Experienced hallucinations-saw things or heard voices that were not there?		
P7. Experienced trouble understanding, concentrating, or remembering?		
P8. Experienced trouble controlling violent behavior including episodes of rage, or violence?		
P9. Experienced serious thoughts of suicide?		
P10. Attempted suicide?		
P11. Been prescribed medication for any psychological or emotional problems?		

P12. How many days in the **past 30 days** have you experienced these psychological or emotional problems? _____

Please use the following scale for questions P13 and P14:
0 = Not at all
1 = Slightly
2 = Moderately
3 = Considerably
4 = Extremely

P13. **How much have you been troubled or bothered by these psychological or emotional problems in the past 30 days?** _____

P14. **How important to you now is treatment for these psychological or emotional problems?** _____

90-Day Time-Line Follow-Back

Instructions: The following questions ask you to recall your behavior of the **past 90 days**, starting from yesterday. It is important for you to remember the **past 90 days** as accurately as you can. If you are not sure of the exact number of days, your best guess is fine. PLEASE do not leave any blanks. If you have not used a substance, enter zeros.

1. During the **past 90 days**, how many days did you spend in a:
   a. hospital for medical problems _____
   b. hospital for detoxification _____
   c. non-hospital residential detox _____
   d. residential treatment for alcohol _____
   e. residential treatment for drugs _____
   f. residential treatment for emotional/psych problems _____
2. During the **past 90 days**, how many days did you spend in a:
   a. jail _____
   b. prison _____
3. During the **past 90 days**, how many days did you live:
   a. in your own house or apartment _____
   b. with others (no rent) _____
   c. in a halfway house other than Oxford House _____
   d. in an Oxford House _____
   e. homeless (including shelters, etc.) _____

Continued on next page

4. During the **past 90 days**, how many days were there [not including hospital or detox days] when you saw a doctor, nurse, nurse-practitioner, or physician's assistant for any kind of medical care?

a. Total days seen for medical care _____

5. During the **past 90 days**, how many days did you have a session with a counselor or therapist?

a. for alcohol problems _____

b. for other drug problems _____

c. for emotional/psychological problems _____

6. During the **past 90 days**, how many days did you attend a meeting of Alcoholics Anonymous or another Twelve-step meeting?

_____

7. During the **past 90 days**, how many days have you been:

a. paid for work _____

b. in school or training during this period _____

c. in a religious service or another religious celebration _____

8. During the **past 90 days**, how many days did you take any medications prescribed by a physician?

a. to treat a medical problem _____

b. to prevent you from drinking _____

c. to help you detoxify/come off alcohol or another drug _____

d. to help you stabilize or change your use of drugs other than alcohol _____

e. for your psychological or emotional problems _____

Continued on next page

9. During the **past 90 days**, how many days did you consume any amount of alcohol? _____

10. During the **past 90 days**, how many days did you use any amount of each of the following drugs:

a. Heroin _____

b. Methadone _____

c. Other opiates/analgesics _____

d. Barbiturates _____

e. Other sedatives/ hypnotics/ tranquillizers _____

f. Cocaine _____

g. Amphetamines _____

h. Cannabis _____

i. Hallucinogens _____

j. Inhalants _____

k. Steroids _____

l. Tobacco _____

m. Other (please specify:_____) _____

Additions to 90-Day Follow-Back

PLEASE ADD:

If you consumed any alcohol in the past 90 days (i.e., if Question 9 was anything other than zero), we would like to know what a typical drinking day was like for you during this time. If you usually drank more than one type of alcoholic beverage on a ***typical drinking day***, answer the following questions for EACH type.

a. What type of alcohol did you usually consume? (*for example, Regular Beer, Light Beer, Malt Beer, Vodka, Gin, Bourbon, Red Wine, Wine Coolers etc.*)

b. How many drinks did you usually consume?

c. What size (amount of alcohol) were the drinks you usually consumed? (*see below for some common standard alcohol measurements*)

Example:		
1. White Wine	**1 bottle**	**750 ml** (standard bottle)
2. Red Wine	**2 glasses**	**4 oz** (standard small glass)
3. Regular Beer	**3 cans**	**12 oz** (standard bottle or can)
4. Tequila	**2 shots**	**1 oz** (standard small shot)

On a typical drinking day Type of alcohol consumed?	**On a typical drinking day** Number of drinks?	Size of **EACH** drink?
1. _____	_____	_____
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____

Some other possible sizes:
Beer – 40 oz can/bottle
Wine – glasses larger than 4 oz. & 1.5 liter (big bottle)
Hard Liquor – shots larger than 1 oz., ½ pint, pint (12 oz / mickey), fifth (20 oz), quart (24 oz), & 1.5 liter (40 oz)

13415

Alcohol Abstinence Self-Efficacy Scale (AASE)

Listed below are a number of situations that lead some people to drink. We would like to know how confident are you that you **would not drink** in each situation. Select the answer that best describes your confidence, at the present time in your ability to resist the urge to use alcohol.

1. When I am in agony because of stopping or withdrawing from alcohol.

O Not at all O Not very O Moderately O Very O Extremely

2. When I have a headache.

O Not at all O Not very O Moderately O Very O Extremely

3. When I am feeling depressed.

O Not at all O Not very O Moderately O Very O Extremely

4. When I am on vacation and want to relax.

O Not at all O Not very O Moderately O Very O Extremely

5. When I am concerned about someone.

O Not at all O Not very O Moderately O Very O Extremely

6. When I am very worried.

O Not at all O Not very O Moderately O Very O Extremely

7. When I have the urge to try just a small amount of alcohol just to see what happens.

O Not at all O Not very O Moderately O Very O Extremely

8. When I am being offered a drink in a social situation.

O Not at all O Not very O Moderately O Very O Extremely

9. When I dream about taking a drink.

O Not at all O Not very O Moderately O Very O Extremely

13415

How confident are you that you **would not drink** in each situation below.

10. When I want to test my will power over drinking.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

11. When I am feeling a physical need or craving for alcohol.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

12. When I am physically tired.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

13. When I am experiencing some phyical pain or injury.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

14. When I feel like blowing up because of frustration.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

15. When I see others drinking at a bar or a party.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

16. When I sense everything is going wrong for me.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

17. When people I used to drink with encourage me to drink.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

18. When I am feeling angry inside.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

19. When I experience an urge or impulse to take a drink that catches me unprepared.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

13415

20. When I am excited or celebrating with others.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

Drug Abstinence Self-Efficacy Scale (DASE)

Listed below are a number of situations that lead some people to take drugs. We would like to know: how confident are you that you **would not take drugs** in each situation. Select the answer that best describes your confidence, at the present time in your ability to resist the urge to use drugs.

1. When I am in agony because of stopping or withdrawing from drugs.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

2. When I have a headache.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

3. When I am feeling depressed.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

4. When I am on vacation and want to relax.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

5. When I am concerned about someone.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

6. When I am very worried.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

7. When I have the urge to try just a small amount of drugs just to see what happens.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

13415

How confident are you that you **would not use drugs** in each situation listed below.

8. When I am being offered drugs in a social situation.

O Not at all O Not very O Moderately O Very O Extremely

9. When I dream about using drugs.

O Not at all O Not very O Moderately O Very O Extremely

10. When I want to test my will power over using drugs.

O Not at all O Not very O Moderately O Very O Extremely

11. When I am feeling a physical need or craving for drugs.

O Not at all O Not very O Moderately O Very O Extremely

12. When I am physically tired.

O Not at all O Not very O Moderately O Very O Extremely

13. When I am experiencing some phyical pain or injury.

O Not at all O Not very O Moderately O Very O Extremely

14. When I feel like blowing up because of frustration.

O Not at all O Not very O Moderately O Very O Extremely

15. When I see other people using drugs at a bar or a party.

O Not at all O Not very O Moderately O Very O Extremely

16. When I sense everything is going wrong for me.

O Not at all O Not very O Moderately O Very O Extremely

17. When people I used to use drugs with encourage me to use drugs.

O Not at all O Not very O Moderately O Very O Extremely

18. When I am feeling angry inside.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

19. When I experience an urge or impulse to use drugs that catches me unprepared.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

20. When I am excited or celebrating with others.

○ Not at all ○ Not very ○ Moderately ○ Very ○ Extremely

Appendix B. Non-renewable Exemption Letter from DePaul's IRB Granting Permission for this Study

DEPAUL UNIVERSITY

Office of Research Services
Institutional Review Board
1 East Jackson Boulevard
Chicago, Illinois 60604-2303
312-362-7593
Fax: 312-362-7574

Research Protections Memorandum

Non-Reviewable Determination

To: Ronald Harvey, MA., Community Psychology, Center for Community Research
Leonard Jason, PhD., Faculty Sponsor, Psychology

From: Office of Research Services

Date: November 14, 2013

RE: Secondary Data Analysis Project

The Office of Research Services has received the materials for your activity that involves secondary data analysis of a data set to be received from Dr. Leonard Jason originating an older study of his. The activity involves the secondary data analysis of data from subjects in Oxford Houses. The data fields for DOB, Oxford House name and location, and the original randomly assigned respondent codes will be removed from the data set before it is received by you. This making the data de-identifiable.

After review of these materials, the Office has determined that the activity is non-reviewable meaning the activity does not require review and approval by the DePaul University IRB because the activity does not involve human subjects as defined by 45 CFR 46.102 (f); it does not involve living individuals about whom an investigator (whether professional or student) conducting research obtains either:

(1) Data through intervention or interaction with the individual, or
(2) Identifiable private information

Please be reminded that revisions to the activity may change its eligibility for IRB review. If you are unsure whether a revised version of this activity requires IRB review, you should contact the Office of Research Services prior to implementing changes.

The Office of Research Services would like to thank you for your efforts and cooperation. If you have any questions, please contact the Director of Research Compliance by telephone at (312) 362-7593 or by email at [illegible]

Sincerely,

Susan M. Loess-Perez, MS, CIP, CCRC
Director of Research Compliance
Office of Research Services

Abstract

Alcohol and other drug (AOD) abuse, treatment, and subsequent relapse and re-treatment are a common pattern faced by clients and AOD treatment providers. Relapse and re-treatment significantly contributes to the overall societal costs of substance use disorder (SUD) treatment, injury, and incarceration. Therefore, it might be useful to treatment providers to become aware of of the factors leading to AOD relapse after treatment. This dissertation examined the relationship of individual factors and AOD relapse among residents of self-run aftercare recovery homes called Oxford House over the course of a one-year study. To accomplish this, this study employed discrete-time survival analysis techniques that compared baseline hazard (risk of relapse) to hypothesized hazard models that included time-invariant and time-varying factors. This dissertation used archival data gathered across four time periods during a one-year study of 897 men and women participants living in 170 Oxford Houses from a U.S. national sample. This study selected a data subset of 268 men and women who entered the OH setting within 60 days of the start of the one-year study to limit eliminate pre-study effects. First, the baseline hazard rates and survival functions were calculated. Based on prior research, four models were constructed to test four hypotheses that were compared for statistically significant effects against baseline hazard rates. First, baseline demographics - age, marital status, and level of education – will be significant predictors of hazard. Second, baseline addiction severity - length of sobriety upon entry into the OH, number of previous treatments, and ASI alcohol, drug, and psychiatric severity composite scores – will be significant predictors of hazard. Third, baseline variables related to employment will be significant predictors of hazard. Fourth, changes in drug and alcohol abstinence self-efficacy over the course of the one-year study will significantly affect hazard rates. Results indicated two of the four hypotheses were supported. The overall model for addiction severity was significant with more severe SUD and psychiatric problems significantly predicted higher hazard to relapse, specifically ASI alcohol severity, ASI psychiatric severity, and the number of previous drug and alcohol treatments. ASI drug severity and days since last used substances did not contribute significantly to the model. The fourth hypothesis time-varying

changes in abstinence self-efficacy across the one-year study did significantly affect hazard. Closer examination indicated that only increases in alcohol abstinence self-efficacy reduced hazard rates, and that changes in drug abstinence self-efficacy had no effects on hazard. Further, neither of the overall models for the two hypotheses involving baseline demographic and employment variables - age, marital status, level of education, employment income, days employed – significantly altered hazard rates compared to baseline. Implications based on these results are discussed. OHs could potentially reduce relapse by providing closer monitoring and referring additional services to residents who have more severe addiction severity prior to coming to live in an OH, and to enhance abstinence self-efficacy, particularly for alcohol. From a design and measurement standpoint, these results indicated that researchers should measure alcohol and drug abstinence self-efficacy separately rather than conflating them, or only measuring self-efficacy for drug of choice. In addition to these findings, this dissertation also represents the first use of survival analysis techniques to analyze relapse occurrence among Oxford House residents. This study also contributes to the literature by performing a rare survival analysis of relapse using a large national sample living in relatively homogenous settings over the course of one year. The author discusses additional future research and advocates research designs amenable to survival analysis techniques, and believes that further survival analyses of OHs are useful and warranted.